Consultative Committee for Space Data Systems

REPORT OF THE
MANAGEMENT COUNCIL

CCSDS MANAGEMENT COUNCIL

MEETING MINUTES

CCSDS B10.0-Y-18

YELLOW BOOK

May 1999

DISTRIBUTION

CCSDS Member Agencies

BNSC	Mr. Peter A. Vaughan
CNES	Mr. Roland Ivarnez
CSA	Mr. Arvind Bastikar
DLR	Dr. Hubertus Wanke
ESA	Dr. Carlo Mazza
INPE	Dr. Eduardo W. Bergamini
NASA	Mr. David L. Townley
NASDA	Mr. Tsukasa Mito
RSA	Mr. Vladimir Starostin

CCSDS Observer Agencies

ASA	Dr. Klaus Pseiner
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NSPO	Dr. Jun-ji Lee
SSC	Mr. Lennart Marcus
TsNIIMash	Mr. O. D. Sokolov
USGS	Mr. Tom Kalvelage

Panel/Subpanel Chairmen

P1 Dr. K. Lenhart (ESA/ESOC)

- P1A Mr. M. MacMedan (NASA/JPL)
- P1E Mr. Jean Luc Gerner (ESTEC/ESA)
- P1F Mr. A. Hooke (NASA/JPL)
- P1J Mr. Felipe Flores-Amaya (NASA/GSFC)

P2 Dr. David Giaretta (BNSC/RAL)

Mr. Nestor Peccia (ESA)
Mr. D. Sawyer (NASA/GSFC)

P3 Mr. Maurice Winterholer (CNES)

Mr. J. Kaufeler (ESA/ESOC)
Dr. H. Uhrig (ESA/ESOC)

Information

Mr. G. Delmas	(ESA/ESOC)
Mr. M. Drexler	(DLR/GSOC)
Mr. W. Poland, Jr.	(NASA/GSFC)
Mr. R. Stephens	(QSS)
Mr. N. Dissinger	(AS&T)
Mr. T. Gannett	(GS&T))

CONTENTS

SUBJECT: Minutes of the Consultative Committee for Space Data Systems (CCSDS) Management Council (MC) Meeting

PLACE: Newport Beach, California

DATE: 17-18 May 1999

I. ATTENDANCE

Organization	Name
BNSC/RAL	Peter Vaughan
	David Giaretta
CNES	Roland Ivarnez
	Jean Latour
CSA	Arvind Bastikar
	David Andean
DLR	Hubertus Wanke
	Peter Piotroski
ESA	Carlo Mazza
	Klaus Lenhart
	Horst Kummer
INPE	Eduardo Bergamini
ISAS	Takahiro Yamada
NASA	David Townley
	Adrian Hooke
	Robert Stephens
	John Garrett
	Merv MacMedan
	Tom Gannett
NASDA	Hideo Hara

II. CALL TO ORDER

The meeting was convened by CCSDS Chairman Mr. David Townley at 1330 hours on 18 May 1999.

III. INTRODUCTION

Mr. Townley welcomed the delegates and noted that Mr. Hideo Hara of NASDA was a new member to CCSDS. The delegates and other attendees then introduced themselves.

IV. WELCOMING REMARKS

On behalf of the NASA, Mr. Townley welcomed all of the attendees.

V. AGENDA REVIEW AND APPROVAL

The final agenda is shown in Attachment A. Items added to the draft agenda included: Space Ops 2000, IAF and COSPAR. The agenda was then approved.

VI. REVIEW OF MINUTES FROM DAMSTADT, GERMANY

The minutes from the Fall 1998 meeting in Darmstadt had been distributed during the April time frame and no comments had been received. It was noted that some information on the membership list as distributed as part of the Secretariat's package is obsolete and has been changed in the Secretariat's database. The minutes from the Fall 1998 meeting in Darmstadt were approved.

VII. SECRETARIAT REPORT

The Secretariat's report (Attachment B) had been previously distributed to all members. This report included the CCSDS Documents Register and Directories of the CCSDS Member Agencies, Observer Agencies, and Associates. It was decided that due to the dynamic nature of the membership records and the document status lists, these lists would be kept on-line in the future.

VIII. REVIEW AND REPORT OF OPEN ACTION ITEMS

The open action items from past meetings were discussed. Comments made relative to these items are included below. Action Items that remain OPEN have been included in the list of new Action Items generated during this meeting. This latter list is given on page 31of these minutes.

STATUS OF MC ACTION ITEMS (From Fall 1998 Meeting)

98-4. Agencies are asked to provide graphics of CCSDS-compliant spacecraft to the Secretariat to enable the creation of a collage showing the full complement of such spacecraft.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: CLOSED It was decided to no longer list this action and consider it CLOSED, It was, however, understood that this is a continuing action on Agency Heads as new missions are approved.

- ESA asked that the Mars Express mission be added to the Fleet Diagram. This became a part of AI 996.

- ESA agreed to provide a picture of the spacecraft for inclusion in the Diagram. This became AI 99-7.

- It was decided that there is no reason why the Fleet Diagram cannot be released to private sector.

- It was also decided that the SLE designation be deleted from the picture.

- Agencies were asked to validate the contents of the Fleet chart relative to their respective agency missions. This is AI 996.

98-6. The TSG shall develop a template for the panel reports to the MC that differentiates between active and inactive items in the work program and shows changes since the last report, panel document status, the schedule for the work, and any issues impacting panel production.

Assignee: TSG Chair
Due Date: Next MC Meeting
STATUS: OPEN – This will continue to be worked by TSG.

98-7. All Agencies should submit their requirements for SLE services.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: CLOSED

- This action had stemmed from a need to identify future P3 Work. This need has been overtaken by events

98-8. All Agencies should submit documentation material relevant to actual cross support interface implementations.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: CLOSED – This action will now be covered by a later Action Item, 98-23.

98-13. The TSG shall review the list of liaisons and determine the appropriate organizations and the appropriate persons to act as liaisons.

Assignee: TSG Chair
Due Date: Next TSG Meeting
STATUS: OPEN – TSG still working on this list and is expecting inputs from the Panel Chairmen.

98-16. The Agencies shall respond to the Agency CCSDS Utilization Questionnaire, which was provided as part of the Secretariat Mail-out Package.

Assignee: All Agencies
Due Date: Next TSG Meeting
STATUS: OPEN

- To date, only ISIS, BNSC, NASDA and NASA have provided material. However, the TSG chairman felt it was still important for other agencies to provide the material requested.

- CSA was asked to respond for those mission for which it has primary responsibility. This may require negotiations with those who provide support and a decision made as to whom is best to respond.

- The Secretariat was asked to transmit the questionnaire to CNES. This became AI 99-9.

98-17. Mr. Giaretta will develop specifications for a Top Management Oriented Marketing Brochure.
Assignee: Mr. Giaretta
Due Date: Next MC Meeting
STATUS: CLOSED-This action is being combined with a later Action Item, 98-23.

98-18. Member Agencies shall consider the proposal for a Top Management Oriented Marketing Brochure with regard to whether they have resources to devote to development of such a document.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: CLOSED-This action is being combined with a later action item, 98-23.

98-19. The Agencies shall collect information on products developed within their respective countries and provide it to the Secretariat for inclusion in the CCSDS-Related Implementations Green Book.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: OPEN

- To date, only non-NASA responses has been received from ESA (Ian de Lande Long of Seehim, Germany), NASDA and BNSC.

- This is seen as an iterative and an open-ended activity.

- Other opportunities to identify companies would be (1) when the document is introduced on the Web and (2) at professional conferences.

98-22. All Agencies shall provide updated information on Agency Representatives for requesting SCIDs.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: CLOSED – This list is complete and has been entered into the latest version of the SCID Blue Book as well as being available via the CCSDS web site.

98-23. Review existing materials promoting CCSDS and develop recommendations for coordinating these elements into a cohesive marketing strategy.

Assignee: D. Townley, D. Giarerra, and E. Bergamini
Due Date: Next MC Meeting

STATUS: OPEN - This action should be addressed by the three principals.

98-24. Panel 1E will research perceived requirement that all S/C have the capability to shut-down when mission concludes to prevent RF interference with operational S/C and determine if CCSDS has a role in promulgating a standard related to this issue.

Assignee: P1E
Due Date: Next MC Meeting
STATUS: CLOSED

- It is suggested that adequate regulations exist within ITU and other places. Further, CCSDS does not have a role in promulgating any related standard.

98-25. NASDA to provide to MC lessons-learned feedback on CCSDS AOS recommendations used on the ETS-VII mission.

Assignee: NASDA
Due Date: Next MC Meeting (Spring 99)
STATUS: CLOSED. Mr Hara provided a response to this item at the meeting that showed significant CCSDS compatibility throughout the mission. Mr. Hara's presentation is Attachment K to these minutes.

98-26. All agencies should review the CCSDS Strategic Plan and submit comments according to the following schedule:

Assignee: All Agencies
Due Date: First Review - 31, Jan 1999
Second Review - 30, April 1999
STATUS: CLOSED – This action was replaced by a new series of actions related to later versions of the documents, see AI 99-10 and AI 99-11,

- This item was also discussed as part of the CCSDS meeting (Item _11) and the reader is directed to that portion of the meeting.

98-27. To highlight the difference in the role of standards compared to quality and safety, the Secretariat will submit a letter to the IAA requesting that they change their name to Operations, Standards, Quality and Safety.

Assignee: Secretariat
Due Date: Next MC Meeting
STATUS: CLOSED: This item has been superceded by AI 99-13.

98-28. The Secretariat will verify the web address of the SCID number assignments and distribute to MC members.

Assignee: Secretariat
Due Date: Next MC Meeting
STATUS: CLOSED - This material has been distributed.

98-29. Panel 1 and the TSG should consider future requirements of SCID number assignments in light of development of IP technology and its application to space communications and develop a recommendation for consideration by the MC.

Assignee: P1 and TSG
Due Date: Next MC Meeting
STATUS: CLOSED -This action will be impacted by the Naming activity and IP technology.

98-30. Panel 1 to recommend action on AOS Blue Books 704 and 705 series as to whether books should be updated to reflect current technology or downgraded to Green Book status for reference use.

Assignee: P1
Due Date: Next MC Meeting
STATUS: CLOSED

P1 has resolutions in this area:

- AOS 704 (Audio and Video) awaits P1-A report on applicability of these protocols for Audio and Video.

- AOS 705 series (four Formal Specifications) should be withdrawn.

98-31. NASA to supply information to ESA to create CCSDS booth to promote CCSDS at European conferences.

Assignee: NASA
Due Date: Next MC Meeting
STATUS: CLOSED - NASA has provided different types of information to ESA for consideration of using this for any subsequent ESA booth.

- -In response to a question as to the status of an ESA booth, Dr. Mazza indicated the ESA PR budget had been cut by almost 50% so there was little chance that they could procure a booth.

98-32. Secretariat to draft statement explaining final draft status that would be included in stable Red Books.

Assignee: Secretariat
Due Date: Next MC Meeting
STATUS: CLOSED

- Secretariat has developed the following statement to be included in the FOREWORD of CCSDS Red Books as appropriate:

  "This CCSDS draft Recommendation has gone through several review iterations and its technical contents are felt by CCSDS technical experts to be sufficiently stable such that prototype implementations started on this basis should be close to conforming to the

final Recommendation when it is approved. Implementers are cautioned that some technical changes may occur as a result of 'beta test' activities prior to the finalization of this Recommendation as a Blue Book. If full stability is required before implementation can be started, please contact CCSDS to discuss the expected schedule for this status."

– Further, pending agreement of this (or revised) text, the Procedures Manual will be revised as:

"It will be the responsibility of the document editor to inform the CCSDS chief document rapporteur when this notice shall be added to the FOREWORD of an existing RB."

– This action was replaced by a new AI 99-3 that requires each RB to have a designation as to the stability of, or lack thereof, the document's contents.

IX. AGENCY REPORTS

BNSC

– Mr. Vaughan reported that BNSC support continues pretty much unchanged. He explained his funding arrangement which will continue at the same level. They are interested in P1 security as well as Archiving in P2. They have not participated a great deal in P3, but are trying to implement some of the SLE services. However, this effort is currently unfunded.

– They have held two workshops, one on Data Archiving and one on New Technologies, New Standards."

– Within the STRV program, they continue to use CCSDS Recommendations.

– Mr. Vaughan's full report is Attachment C to these minutes.

– He made a special request to the MC to address performance testing. UK is interested in this and is trying to put together a plan for an independent testing organization. They would like to hear from other agencies. He asked if anyone could identify an industrial company that might be interested in this type of work. Adrian mentioned one company of which he was aware that did performance testing but it was quite expensive to do. There was always the problem that the market is not yet large enough for the government or company to undertake this activity.

– It was mentioned that we could use our position in ISO to broadcast this need to see if any industry would be interested in undertaking this.

– The suggestion was made that we could inquire of SC13 and SC14 with their industrial contacts around the world to encourage the establishment of a consortium.

– This was also suggested that this could perhaps be an item for a joint 13/14 meeting.

- It was noted that we don't completely understand what companies must do to certify performance. The manufacturer makes a claim, the company first does a paper check and then plugs the equipment into a test jig and verifies performance.

- CCSDS would have to say what the tests would be.

- There again was discussion about the applicability (and cost) of preparing PICS for this effort.

- The question was raised as to just what does MC want from a Conformance Matrix testing.

- The MC admitted that they could not provide some of the guidance requested. They had in turn proposed a procedure whereby panels would provide their ideas of conformance and bring that to the MC for acceptance. The MC is still expecting recommendations from the panels.

CSA

- Mr. Bastikar stated that his funding is stable for the first time. He confirmed their participation in Panel 1 and Panel 2, but not in P3 this year.

- CSA will inform Dr. Giaretta of the name of a P2 member from CSA to be added to the P2 membership list.

- Mr. Bastikar hopes to fund within three months the restart of the planned test bed activity with MacDonald Detwilder.

- He reported that Radarsat-1 had been CCSDS compliant and that Radarsat–2 will be also.

- There is now funding for Smallsat and Microsat which hopefully will be CCSDS compliant. These are planned to test technologies.

- Regarding Telesat, two satellites are planned for broadcast application. One is being launched from Russia this month. The other will have two unique payloads which will be compatible.

- Mr. Bastikar's full report is Attachment D to these minutes.

CNES

- Mr. Ivarnez reported that CNES continues its level of support at four man-years. CNES supports most of CCSDS activity, being involved in all subpanels of P1, P2 as well as chairing P3. They are also involved in other standard activities like ECSS and ISO TC20/SC14.

- The use of CCSDS standards at the agency is increasing. It is baselined for the Mars Sample Return project and is being introduced into a new series of microsatellites which will use CCSDS for telemetry and telecommand.

- He described the microsatellite program which plans two launches each year on the Arianne vehicle.

- Mr. Ivarnez's full report is Attachment E to these minutes.

DLR

- Dr Wanke reported that GSOC continued its CCSDS work with emphasis on P3 activity.
- They continue to be active within P1E in bandwidth conservation.
- They are interested in P1J work in navigation and will participate in this.
- They continue in a "monitor role" relative to P2 activity.
- With regard to P3, they both chair WG 2/3 and plan to emphasize the use of SLE services for ground delivery services relative to the European part in the Space Station. They also plan to establish SLE services in the modernization effort for the DLR Wilheim station.
- With regard to supporting TSG work, they are concerned about the impact of the additional work envisioned in the Strategic Plan.
- He presented a matrix of five German missions being built to CCSDS.
- He reported on the loss of one mission, ABRIXAS, due to a battery failure and noted there is only a limited chance to recover satellite. This has generated a concern regarding the concept of better/faster/cheaper missions. After some spacecraft losses, many responsible people in Germany feel we should re-think the tendency to put so much intelligence onboard if the ground cannot override these systems.
- He feels we should report on our "Lessons Learned."
- He also feels that standardization is a way of capturing corporate knowledge.
- Dr. Wanke's full report is Attachment F to these minutes.

ESA

- Dr. Mazza reported that ESA is being impacted by unfavorable budget decisions. The recent budget decision to keep the level of science activity at a constant level did not take inflation into account. The science community is trying to correct this situation.
- ESA still is committed to actively supporting all aspects of the CCSDS program although cost-cutting measures will have to be introduces in both the long and the short terms. Some 20 people are engaged in CCSDS work at a level of 6-7 man-years of effort.
- He plans to submit a cost-cutting proposal later in this meeting.
- They are implementing SLE in conjunction with JPL for Integral, Rosetta and the Mars Express missions. They also plan to propose the CCSDS Recommendations, or the equivalent ISO Standards, to ECSS as new standards and feels they will be adopted by ECSS. Dr. Mazza feels this will be of benefit to CCSDS because of the greater discipline that ECSS will represent within the European space community.

- Dr. Mazza's full report is Attachment G to these minutes.

- There was discussion as to how the ECSS would "number" these standards which for the most part already bear an ISO designation. ECSS does not plan to give an ISO standard a new number.

- Copies of ECSS Standards will be available from ECSS but there will be a charge for them.

- Dr. Mazza expressed concern regarding the CSOC contract with rumors that CSOC would not adopt SLE. The European community would like assurances from NASA that this will not happen. Mr. Townley noted that this subject will be discussed in June at the Interoperability Conference in Paris.

INPE

- Dr. Bergamini reported that INPE continues its support of CCSDS and feels this activity will result in availability of CCSDS-compatible COTS products-The initiative of the Brazilian Space Agency (AEB) through the Brazilian Association of Aerospace Industries (AIAB), is promoting the adoption of aerospace standards in the Brazilian space missions.

- Achievements of SC-13, SC-14, and ISO Subcommittees are followed as a source of standardization of the pertinent Brazilian aerospace activities.

- Very recently, INPE Directorship placed a clear request for their serious considerations in adhering to the CCSDS Recommendations.

- Also, INPE's increasing involvement with the SC-13 and SC-14, TC-20, ISO work is resulting in a competent technical body of experts cognizant of CCSDS Recommendations. However, he cannot yet fund these additional people to attend the CCSDS meetings.

- NOTE: Later in the meeting, Dr. Bergamini asked for a CCSDS tutorial to be given in Brazil around the time of the SpaceOps meeting being held there.

- He described some of Brazil's space program, including some launches from China.

- He stated that, notwithstanding recent and severe devaluation of the Brazilian currency, things are improving.

- Dr. Bergamini's full report is Attachment H to these minutes.

ISAS

- Dr. Yamada reported on ISAS' use of CCSDS. He presented a matrix of upcoming missions as well as ground facilities that use CCSDS recommendations.

- He did state that CCSDS Telecommand is being dropped from SOLAR-B.

- He noted that there had been some problems trying to use TC on some missions and hopes this changes in the future. They plan to use SLE in a cross support activity.

- Regarding CCSDS documentation, ISAS is editing five P1A documents and a sixth is under review. He plans to have six white books by the next meeting. Additionally, he will be editing two green books.

- ISAS funds this one-man effort at 1/2 man-year. He spends 15% of the time on CCSDS documents and the rest of his time is spent on projects. He feels this is a good combination for effecting entry into ISAS projects.

- Dr. Yamada's full report is Attachment I to these minutes.

NASA

- Mr. Hooke presented the NASA report. He referenced changes at NASA Headquarters and indicated that we are glad that Mr. Robert Spearing, deputy for Operations and a strong supporter of CCSDS standards, will be leading the NASA delegation to the interoperability meeting in June. Mr. Hooke is helping in the preparation of the NASA position.

- He reported that Lockheed-Martin has been awarded the CSOC contract and we have been developing a working relationship with these people. CSOC people say they are a "customer for standards" but not developers of standards. They will take 5 years to re-engineer the near-earth systems. They will then turn to other advanced integrated systems. NASA emphasized again the need for CCSDS to work closely with CSOC so as to avoid CSOC adopting commercial standards for space.

- Mr. Wallace Tai now is acting manager for a new Systems Engineering Office at JPL. This significantly elevates the recognition of standards within JPL and Mr. MacMedan will play a significant role in this activity.

- At GSFC, there is a new thrust to encourage greater support of the Standards Program. Also, there are plans to develop a testbed activity in conjunction with the WIRE spacecraft to compare communications protocols.

- At the International Telemetry Conference in San Diego last Fall, some 350 copies of the CCSDS CD-ROMs were handed out with lots of questions raised about CCSDS.

- NASA is assembling a data base of CCSDS compatible products which show a significant number of COTS vendors. The database on COTS implementations is available at: http://hope.gsfc.nasa.gov/ccsds/implementations. (This will be discussed later in more detail.)

- Regarding CSOC, this has been an extreme challenge with a series of spirited workshops held to discuss the contractor's Integrated Operations Architecture (IOA) with concern about communications protocols being considered. NASA has an entry into this activity with regard to developing standards before any final selections are made. NASA is proposing that the CSOC contractor join the NASA standards development effort. Increased participation on their part is anticipated. In fact, a CSOC employee came to the P3 meeting last week and the preliminary feedback is encouraging.

- Budget-wise, NASA is still at the same level of funding, roughly $3.6 million, which supports some 2-3 Civil servants and about a dozen contractors. Some of this work will be

picked up by the SOMO contractor. NASA needs to identify other sources of funding from those entities which benefit from standards.

– The Mars program is crystallizing and at least two workshops have been organized to address interoperability of its numerous missions. The present environment is parallel with the Space Station effort of ten years ago.

– Mr. Hooke's full report is Attachment J to these minutes.

– Regarding the CSOC contract, there is no obligation on the contractor to apply CCSDS standards. This is a performance contract with the objective of providing agency services at a lower level of cost.

– There was a major deficiency in that there was not adequate consideration given to NASA's international commitments. This issue is being addressed by NASA.

– NASA still has the ultimate say in what the contractor provides, but the primary customer is JSC that does not have a great deal of experience in the total space support environment.

– Bob Spearing's opinion is that if NASA feels the contractor is not going in the right direction, NASA can redirect them. The contractor is not too experienced in the area of standardization. NASA needs to convince them of the advantages of our standards and progress lately has been encouraging.

– One major point for the June meeting in Paris on interoperability is the implication/uncertainty of present cross-support agreements with the international community. David Townley stated that NASA will come in with a strong position re use of CCSDS Recommendations while the IOA is still flexible (until October). NASA will have a chance to review the contractor's plan for accommodating our international commitments. NASA has the final say as to what projects the CSOC infrastructure will support

– SOMO has the direct oversight responsibility over the CSOC contractor and SOMO reports to Bob Spearing.

– ESA's position is that any cross-support negotiation will be with NASA and not the contractor. There may be legal implications regarding direct dealing with the contractor. This will depend on the nature of the agreements covering each mission

– CCSDS will still be the developer of standards while the contractor is the user. We would like them to be involved in our development activities as well as their providing some funding in this area.

– CSOC does not cover all the operational aspects that NASA performs.

– Relative to international government-to-government agreements, the interface will still be with NASA.

– The first phase of the contractor's work will be to integrate the low-earth activity which will take five years. NASA has some time to convince CSOC about the use of future protocols.

- It was reported that the CSOC's first priority is to support NASA's commitments. Commercial activities are a lower priority.

NASDA

- Mr. Hara reported on NASDA activities.
- He listed some eight (8) NASDA missions which are compatible, to various degrees, with CCSDS Recommendations.
- He stated that design has started on the next generation, general purpose ground station that can cope with a wide range of CCSDS Recommendations.
- He also described NASDA's participation in the various components of the CCSDS program, P1, P2 and P3.
- He stated that each NASDA spacecraft project applies ISO or CCSDS Recommendations as they are.
- He enumerated the NASDA people supporting CCSDS activities; the assignments were: on P1 - four people, on P2 - one person, on P3 two people, on TSG/NMC/SC13 - two people. The level of effort was not given.
- Mr. Hara's full report is Attachment K to these minutes.

X. SUMMARY REPORTS FROM TECHNICAL PANELS

NOTE: The several panels having already reported to the TSG concerning the technical content of their programs, their reports to the MC focussed mainly on the status of their documents with regard to progessing them through the MC and to ISO/TC20/SC13.

Panel 1:

Panel 1A

- Mr. MacMedan reported on his subpanels activity which had made significant progress in many areas.
- The Turbo Code was to be included in a revised Coding Blue Book.
- He recommended working with JPEC2000 in selecting lossy compression algorithms and related his experience surfing their Web site.
- He described the excellent work being done by Dr. Yamada in restructuring the sub-panels documentation.
- He presented a number of resolutions regarding progressing telemetry, telecommand and proximity link documents to their next level. (These are all listed in the minutes under MC Resolutions.)

- Mr. MacMedan's full report is Attachment L to these minutes.

Panel 1E

- Dr. Lenhart presented this report.
- He stated that Panel 1E continues its work on bandwidth efficiency despite the decision by NASA to withdraw its support until new funding can be obtained.
- He also identified the documentation that will be proposed to move to its next level. The recommendations are included in the minutes under MC Resolutions.

Panel 1F

- Mr. Hooke reported that work has been completed on the CCSDS File Delivery Protocol (CFDP) Red Book, the SCPS books should be advanced to Blue and to ISO as DISs. He asked that the Mars Proximity Link protocol WB be submitted to ISO as a Committee Draft (CD). These and other recommendations are listed in the minutes under MC Resolutions.

Panel 1J

- Dr Lenhart reported that a work plan has been defined and a draft White Book (WB) has been developed by Panel P1J for navigational data transfer.

Security Working Group

- Dr. Lenhart reported that the Security WG progress has been delayed for six months because of funding limitations. Prospects for work in this area appear better and the TSG had adopted the same program of work for the next six months as had been planned for the last six months.

Panel 2

- Dr. Giaretta presented the Panel 2 report.
- He reviewed the P2 program of work as listed in the CCSDS Operating Plan Theme and subtasks, itemized some recommended changes in these subtasks and identified results in each of their seven working groups.
- He discussed P2 security needs.
- He listed the impact to P2 of the Mars Proximity links.
- He showed the liaison activities being conducted by P2.
- He listed a number of resolutions to be made to the MC relative to progressing P2 documents to their next level. In particular, he presented a proposed procedure for MC consideration relative to working with outside bodies and progressing their documents to and through ISO.
- Dr. Giaretta's full report is Attachment M to these minutes.

Panel 3

- Mr. Brosi presented the P3 report, showing the P3 organization and their respective task assignments.

- He also showed the P3 document development schedule and indicated that work had progressed very well during this workshop with progress being made on all the documents being addressed.

- P3 did not have any documents to be progressed either to ISO or to the next level within CCSDS.

- Mr. Brosi's full report is Attachment N to these minutes.

TSG

- Dr. Lenhart presented a brief report of the TSG meeting. Topics discussed at the meeting concerned the activities of the Addressing, Security, and Strategic Plan working groups. Details of the meeting are available in the TSG Meeting Minutes.

XI. REPORT FROM LIAISONS & REVIEW OF LIAISON RELATIONSHIPS

- Liaison with SC14 is being conducted by Dr. Lenhart.

- Mr. Bastikar had just come from an organizing session in Paris for the UNISPACE meeting. He noted that Dr. MacGregor Reid is chairman of one session; there are other people from user groups. He felt CCSDS should have greater participation in this kind of an activity, This is a high profile activity with 181 companies represented. It meets only every 14 years although there are lower-level meetings more frequently. He proposed that some of the CCSDS/SC13 officials could be invited to speak. At present, only one person will speak for CCSDS; David Giaretta's availability was uncertain.

- Mr. Bastikar made a proposal that SC13 and SC14 join together and attempt to be constituted as a new technical committee, completely removed from TC 20. He has a resolution asking all P members of TC20/SC14 to consider a timetable for holding a vote to this effect. He claimed the Secretariat would be providing details. He urged a resolution for SC13 to consider this action. He would like to inform TC20 of their/our intention to form a new TC of SC13 and SC14. He felt there could be coordination between SC13 and SC14, particularly Working Group 3 of SC14. He stated that SC14's first international standard was related to Launch Support. It was progressed by someone from KSC. He felt that SC13 was far more organized than SC14 and well ahead of them in our management approach.

- SC14 plans to hold one plenary a year and the next meeting will be DLR.

- He also talked about CCSDS becoming involved with the IAA and mentioned that there will be a meeting in a year or two at NASA.

– He also mentioned a June 13 ITU meeting. This is usually attended by over 200 people, but it is not well organized. He expressed concern that we are not doing an adequate job in this area.

– Relative to the UNISPACE meeting this July, there is a session on standards. Mr. François Abram will provide an overview of ISO standards. Dr. Lenhart and Dr. Giaretta have volunteered to speak on CCSDS's behalf.

– Mr. Hooke mentioned that he had received a request for vu-graphs from Mr. Gael Squibb for some reason (unknown to Mr. Hooke but possibly for this July 27 session.)

– Dr. Lenhart recommended a joint meeting between SC13 and 14 be held. This is a long standing agenda and the action is currently with Mr. Townley. Mr. Townley is not comfortable holding a meeting without an agenda. It was noted that one topic has now been identified, that of conformance testing.

– Mr. Townley asked if we should meet with the entire SC14 or just its Working Group 3. We need to meet and discuss coordination of work and cross-feed information to avoid overlap. Perhaps we should identify a small group to meet with SC14 to meet and work out an agenda. This could be triggered by the formulation of our Operating Plan.

– There was a general feeling that there are some areas where greater coordination is advisable. One such area is our new work item on Spacecraft Onboard Interfaces. SC14 has a Web Site that provides an opportunity to determine where SC14 is going. Mr. Townley stated that he will renew his effort to pursue coordination.

– Mr. Townley stated that we have passed on to the MC members a document, ISO CD 14950 provided to us by Mr. Latour, for their review. –Dr. Lenhart mentioned that Panel 1E has liaison with SFCG, ITU and others. They are also coordinate with the European ETSI telecommunications people.

– Closer coordination with JPEC 2000 is needed, and that will be addressed by the Secretariat.

– Dr. Giaretta noted that P2 has liaison with:

  CEOS for CIP
  TC211 for CIP
  NCITS'L8 (ANSI)
  ISO 11179/X3.285 for DEDSL

– He has also been trying to talk to the IRTF to establish some liaison. The IRTF has a working group with a charter similar to that of Panel 2.

– P3 did not identify any liaison activity yet as it is too early in their program to become involved with outside activity.

XII. SPECIAL TOPICS:

CCSDS STRATEGIC PLAN

- Dr. Kummer distributed the latest version of the Strategic Plan. He indicated that this represented two iterations of the original document by the working group.

- He reviewed the contents of the document and identified the changes made during the recent iterations.

- Mr. Bastikar had a concern about the plan's reference to a "10-year period". He felt a "Plan" inferred a less definite time period.

- There was a great deal of discussion regarding the order of the subjects in the plan. One suggestion was to present the charter, the mission and the objectives all in a single document.

- The definitions should be put in an Annex.

- There also was discussion and concern regarding who should sign the signature page in the Strategic Plan, or if it should even be included. DR, Wanke felt that the signature page should be signed by MC members since they have been appointed to represent their respective agencies and their finding the necessary resources is implied.

- Changes in the text were made in just about every section of the Plan.

- Mr. Gannett attempted to collect all the pertinent comments and included them in a Version 3.1 of the document which he distributed by the end of this session. Attendees are to comment on this version of the plan by early June. This document is Attachment O to these minutes. The Document editor will then incorporate comments and reissue them as version 4.

- The members would not only review version 4 but would indicate their agency's acceptance of the plan by e-mail or electronic signature by July 15. It was agreed that this would be a stable document and not changed frequently.

- It would serve as a commitment by the agencies to the task of the CCSDS.

- Mr. Hooke stressed the importance of this document's being generated in the current environment

- Mr. Ivernez showed a diagram of his understanding to the hierarchy of CCSDS management documents presenting the involvement of management at various levels. This diagram is Attachment Q.

- There was concern expressed regarding the degree of commitment this document would represent to each agency.

CCSDS OPERATING PLAN

- Dr. Kummer reviewed this document and, in particular,the matrices he had developed of the comments received. Here too, a number of comments were made. This document will be reviewed and modified during the next six months.

- Mr. Hooke presented the six themes within the Operating Plan:

  1. Efficient communications;
  2. Standard Data Interchange and Archiving Services;
  3. Standard Space Mission Operations Services;
  4. Interfaces with Dedicated Commercial and non-Commercial Systems;
  5. Space Missions as "Nodes on the Internet"; and
  6. Interoperable :Plug-n-Play Spacecraft Components.

- Presentations were made relative to the content of each of these six themes. It was suggested that we build a matrix showing what agencies are involved in what themes and subtasks.

- Theme 1 has nine subtasks that are defined by title, justification, mission, schedule, priority, implementer, and mode of implementation. Mr. Hooke gave an example in each of these instances. He referenced teaming with the Digital Video Broadcast Satellite (DVB-S) group in the coding area.

- Some themes are being worked and others represent new work to be undertaken.

- People are invited to review the subtasks and make comments.

- Emphasis should be put on ensuring that task maintenance is adequately represented and other management considerations like task and schedule are reasonable.

- Perhaps these should be linked with some other document that identifies cost and schedule; we could possibly attach a work breakdown structure.

- Mr. Ivernez requested we use another formulation and avoid "migrating away from portions of the spectrum."

- We must recognize the reluctance of panels to move away from their core capabilities into areas where some expertise is NOT resident. We need to stress the work to be done by a panel and seek the proper expertise.

- Theme 2 has three sub-tasks. P2 felt these three subtasks were sufficiently broad to cover their work.

- Theme 3 has six sub-tasks. These tasks are essentially covered within P3 with a small amount of interaction with P1J and P2.

- Theme 4 is to develop Interfaces with Commercial Systems. We need to exploit commercial interests and integrate these with an interplanetary internet.

- Theme 5 could extend into integration of relevant SC13 and SC14 activities. It was noted that ESA has volunteered to start a study in this area. (See Resolution MC-S99-2.)

- An objective and schedule were discussed (See Action Item 99-11) whereby we could have this Operating Plan refined by the next Management Council meeting.

- Agencies were asked to fill in the matrices over the next two months.

- Accounting for several intervening iterations, Version 6 of this plan should be completed by the next MC meeting.

- The Theme Matrices for the Operating Plan are Attachment P.

PROPOSED ENHANCEMENTS TO CCSDS HOME PAGE

- Mr. Garrett reviewed the proposed changes to the CCSDS Home Page. These are NASA's suggestions to affordable changes to the Web Site. He said that some users claim we need to improve the current presentation.

- He noted that bandwidth is still a problem for some agencies which is a consideration constraining the magnitude of the proposed changes. This contention was contested since there would be a number of graphics in the site content. The Fleet chart could be available via a link.

- Dr. Bergamini wanted to see a list of documents under review; this could be in the Document Library entitled "Documents under Review".

- An objective of the proposed design is to make each page look very similar.

- In response to a question, Mr. Garrett noted that there is a "search for documents" capability but not a "search for pages".

- A decision had been taken against our site having links to agencies satellite databases.

- Mr. Garrett invited comments on the proposed changes.

- It was requested that Agencies provide information that would enable Mr. Garrett to provide links to their Agency Web Sites.

- Dr. Giaretta would like to see an ability to handle requests for metadata.

- The MC Minutes are on the Web; TSG minutes are on the TSG web site and NASA plans to post the minutes routinely.

- Mr. MacMedan noted that there are two things required in dealing with general public:

1. What is the significance of "color" in document, i.e., Red Books, Blue Books; this should be explained in online text rather than CCSDS's continuing to use colors for the book covers to indicate the status of the proposed Recommendation.

2. When work is described to the outside world, we should avoid reference to the panels performing these activities since this has no significance to users.

– The question was asked, "What is the consensus as to the purpose of the Web site?" The answer was seen as, "It should be a good tool to show ourselves to the outside world."

– We should have a description of how we work under one "hot button".

– Mr. Garrett presented five resolutions which were accepted after discussion:

1. use new "look and feel" format;

2. provide membership lists on-line including links to members and associates web sites;

3. provide all Red Books on the public portion of the CCSDS web site and on the CCSDS CD-ROM but not "draft" Green Books. (Document editors and the respective panel chairmen shall determine when a Green Book can provide useful information and is, therefore, ready for release.)

4. remove Panel 4 from organization structure discussions; and

5. allow inclusion of or links to CCSDS related news articles. (This is difficult to keep up to date and should not be too inclusive. The Panel Chairs were requested to provide information about new activities.)

– Dr. Lenhart again reiterated that bandwidth restriction is still a problem within Europe and he would not like to see a lot of useless information included in the Web site.

– There is a site map to be included on the Web page.

– It is possible to turn off the diagrams.

– We need to compromise between "Jazz" and "utility".

– NOTE: In later discussions, it was decided to add a "button" on the Home Page to direct potential users to a list of CCSDS-compatible vendors and products.

– Mr. Garrett's full report is Attachment R to these minutes.

COPYRIGHTS

– Mr. MacMedan reported the following experience: DVT has a standard which covers a great deal of material similar to the P1A activity. All their standards are listed on their site. If one "Clicks Here" to display some material and one wishes to "Download or Copy", he is asked if he is a Member or First-Time user. There is an indication that the documents are copyrighted and questions are asked of the inquirer as to the nature of his activity. This pertinent information is used to compile a database of people interested in this standard.

They then must sell their mailing list to recover cost of maintaining the site. The material is available if one is willing to subject oneself to subsequently receiving advertising material.

- What inference does this mean to us if we do not copyright?

- Should MC establish a WG to look into the advisability of copyrighting our documents. Mr. Bastikar said he will look into the Canadian arrangement regarding copyright laws. Mr. MacMedan will look into the United States arrangement re copyright laws. He noted that while NASA funds JPL, Cal Tech copyrights JPL activities.

- The question was asked, "Can anything in the public domain be copyrighted by anyone who had not produced the material."

- After discussion it was decided that no official WG will be formed to investigate the subject of copyrights.

PROPOSED CHANGES TO THE PROCEDURES MANUAL

- Mr. Stephens presented several proposed changes. One proposal dealt with a time scale for delivery of Red Books to the chief document rapporteur. The MC requested that a similar time scale be included for delivery of Blue Books as well.

- The MC rejected the idea of adding to the TSG's charter the responsibility for generating the Strategic Plan. The MC felt this was too detailed for the Manual.

- Regarding the proposal to change the distribution of documents from hard copy to electronic versions and CD-ROMs, for both Red Books and Blue Books, it was agreed that printed copies of documents will no longer be provided in quantity, but small quantities will be provided upon request. These, of course, will not have the same CCSDS quality as the printed documents.

- With the exceptions noted above, the MC accepted the proposed changes.

- Mr. Stephens' charts are Attachment S to these minutes

PROPOSED NEW GB "CCSDS-COMPATIBLE PRODUCTS"

- Mr. Stephens presented a proposed new GB entitled, "CCSDS-Compatible Products." After discussion, it was decided to place this information in an Online database with each entry duly noted as to the time it was added to the database. Further, a button should be added to the CCSDS Home Page directing users to this information. The database should also include a notice as to how an new vendor's product can be included.

- The current URL for the document should be transmitted to the members.

- A plea was made for panel chairmen to inform Mr. Stephens of what CCSDS-compatible products they can identify.

- Mr. Stephens' chart is Attachment T to these minutes.

SC-13/14 LIAISON

- The general feeling of the MC was that this topic had previously been discussed.

XIII. CCSDS MARKETING OPPORTUNITIES

SPACE OPS 2000

- Mr. Townley reported on the activity in this area, including the consolidation of three action items.

- CNES is organizing this activity in Toulouse. They asked CCSDS if they wanted to participate in Theme 5, Cross Support and Inter-Operability and have a standardization session.

- This theme includes standards and CCSDS could plan to discuss some specific applications of standards as a follow-up to the presentations about CCSDS made in Tokyo in 1998.

- CNES was looking for guidance from MC as to what they should be including in their planning. There was agreement that we should make an effort to take advantage of this opportunity. We should ask Agencies to notify their members of this opportunity and then solicit ideas from the agencies when more information is forthcoming from the planning committee.

- Each agency is to take responsibility for coordinating and organizing their agency's papers. So many CCSDS papers have been received in the past that it was difficult for the Committee to select the right combination of papers. Coordination at the agency level would help.

- It was noted that Mr. John Rodgers is the NASA representative to Space Ops

UNISPACE MEETING

- This UN meeting had been covered under Liaison Reports

IAF

- We were not able to obtain an invitation to their Melborne meeting.

- Regarding the IAF Amsterdam meeting, there had been a meeting last month to lay out the program, but the resolutions from that meeting are not known. One possibility would be an opportunity to give a presentation on CCSDS, but a half-day session on our standards was unlikely. The Secretariat is to determine the outcome of that meeting. If allowed to present at the IAF meeting, we should stress our achievements and products. Perhaps we could send one person.

- Dr. Bergamini indicated that INPE will host the IAF 2000 in Brazil. He showed the organization of the symposium, noting that he will be the Rapporteur of the Mars Exploration session. He asked, "What is CCSDS position regarding being involved?" It was noted that Mr. Hooke could give a presentation. Dr. Bergamini could seek acceptance of whatever we want to do.

- The Call for papers is out but the closing date is not known. Dr. Bergamini will track this.
- It was noted that IAF focuses on scientific return of missions and not so much on the operation.
- IAF does not seem to recognize the advantages of interoperable data systems. CCSDS could concentrate on having them recognize this need. At the next IAF meeting, we should point out the advantages of CCSDS and show the Fleet diagram
- Dr. Bergamini stated that the Rio meeting would address actual systems.
- It was agreed that Dr. Bergamini, in his role on the planning committee, should use his influence to persuade IAF to include consideration of standards and seek an opportunity for inclusion of CCSDS presentations on the agenda.
- Dr. Bergamini asked that a CCSDS tutorial be given to the Brazilian community as a marketing activity to describe benefits to be derived through the use of CCSDS Recommendations.

COSPAR

- Dr. Bergamini felt we should contact COSPAR and provided a copy of his letter (which had not been delivered previously) to the Secretariat on this subject.
- There is consideration in 2002 of a joint COSPAR/IAF meeting.
- The Secretariat was asked to follow this activity.

XIV. NEW BUSINESS

Mars Interoperability

- Mr. Hooke noted that there will be a flotilla of spacecraft visiting Mars and there are problems of interoperability among these missions. Also, the DSN is oversubscribed. Workshops have been held to articulate the collective problems of acquiring and handling the data. He has suggested an interoperability forum be established to address these issues. Possible standards for use in this program include:

  1. Optical communications.
  2. Standard operating specifications.
  3. Transponder modem.
  4. Proximity Network.
  5. Proximity link.
  6. Scheduling.
  7. Clock Synchronization.
  8. Ranging (The question was asked if we need one standard).

- Politically, it became clear that projects and program people are somewhat at odds regarding the establishment of some type of collective forum.

- Mr. Hooke noted that on Space Station we formed a Space Station Advisory Group, perhaps we should do the same for Mars.

- CCSDS needs to look at Mars as the potential sponsor of work to be done.

- We need to get Mr. Elachi and Mr. Squibb to formulate a position on this issue that would be levied on the projects.

Review of CCSDS Working Methodology

- Dr. Mazza explained the situation within ESA and discussed his proposal to reduce the frequency of some meetings, to limit participation to relevant experts and to avoid scheduling contiguous meeting.

- There was discussion on the elements of his proposed methodology.

- 14 ESA people had requested approval to come to this CCSDS meeting but only 7 had been authorized.

- The problem is driven both by visibility and budget and the location of meetings causes some problem.

- His proposal would not be put into effect until 2000.

- Panel and Subpanel meetings will be held when needed, and their frequency of meetings need not be reduced. MC and SC13 meetings would be reduced to yearly occurrences.

- It was important to show management the impact of travel restrictions on the CCSDS operating plan. The core of the problem is to seek management endorsement of the activity.

- David Townley noted that we need to consider a response to the immediate problem while also maintaining the momentum of the activity.

- Meetings are seen as a help in getting people away from their offices where they can better concentrate on a problem with their peers.

- It was noted that small agencies have to travel most of the time since few meetings are held at their facilities.

- We need to convince management that we are managing the program effectively and to justify what each person is doing under the total effort. Most panels are already maximizing the use of electronic means of coordination.

- It was stated that the MC has two functions: (1) progresses documents and (2) makes decisions regarding other activities. We could do the first by electronic voting using e-mail.

- It was suggested that management has no perception of what we are doing; they only see the loss of their people to other activities and the associated travel costs.

- Dr. Mazza indicated that this MC need not take a position at this time regarding the Spring 2000 meeting.

- We should work out the details of the CCSDS Operating Plans to show management the rich work program that exists within CCSDS. The TSG and the Panels should strengthen their work program descriptions.

- Each agency was tasked to suggest ways of improving the operations of the MC.

- The MC endorsed the revised meeting schedule and the new methodology for the panels at least for the time being. They planned to continue with the present schedules for the Fall 99 and Spring 2000 meetings and hold in abeyance decisions regarding the Fall 2000 meeting.

- Dr. Mazza's proposal is Attachment U to these minutes.

XV. 14. PLANNING FOR NEXT TSG/MC MEETINGS

The final dates for the Fall 1999 meetings in Frascatti, Italy were set for:

TSG on October 18

MC on October 19/20(AM)

ISO/SC13 October 20 (PM).

The tentative dates for the Spring 2000 were set for:

TSG on June 26

MC on June 27-28(AM)

ISO/SC13 on June 28 (PM)

These meetings will be held in Toulouse, France, on dates picked to be compatible with the Space Ops 2000 which meets from June 19-23.

XVI. APPROVAL OF RESOLUTIONS AND ACTION ITEMS

This subject was deferred until the Resolutions and Action Items have been finalized and distributed.

XVII. ADJOURN

In closing, Mr. Macmedan noted that we had 150-152 registered participants at this meeting series making it the biggest and longest workshop we have had to date, although part of the attendance was probably due to the interest in the Mars activity. In passing, it was noted that the Internet Engineering Task Force typically has about 2000 people at their meetings.

RESOLUTIONS

CCSDS MANAGEMENT COUNCIL
17-18 May, 1999
Newport Beach, California

MC-S99-1. CCSDS resolves to maintain the membership list and the document status list on-line in the future in lieu of distributing hard copies with the Secretariat's package

MC-S99-2. CCSDS resolves to create an interim Working Group on Spacecraft On-Board Interfaces. The WG will be led by Mr. D. Maeusli, from ESA/ESEC with the initial objective to perform a inventory of existing interfaces. Agencies are invited to assign experts to this working group. This working group should interface closely with SC14 with regard to these interfaces

MC-S99-3. The CCSDS resolves to add Turbo Coding to the current Telemetry Channel Coding Blue Book and republish it as CCSDS 101.0-B-4, dated May
1999.

MC-S99-4. The CCSDS resolves to request ISO/TC20/SC13 to process the revised Telemetry Channel Coding Blue Book, CCSDS 101.0-B-4, May 1999 as a DIS.

MC-S99-5. CCSDS resolves to publish the Proximity 1.0 Space Link Protocol, CCSDS 211.0-W-3, April 1999, (as amended at the Spring 99 meeting) as Proximity Space Link Protocol CCSDS 211.0-R-1, dated May 1999 and to distribute it to the agencies for review and comments.

MC-S99-6. CCSDS resolves to establish liaison status with the JPEG2000 standardization effort (ISO/IEC JTC1/SC29/WG1, chaired by Dr. Daniel Lee of Hewlett-Packard) to allow CCSDS members access to the JPEG working papers.

MC-S99-7. CCSDS resolves to issue the four SCPS specifications as CCSDS Blue Books:
- CCSDS 717.0-B-1 SCPS File protocol
- CCSDS 714.0-B-1 SCPS Transport Protocol
- CCSDS 713.5-B-1 SCPS Security Protocol
- CCSDS 713.0-B-1 SCPS Network Protocol

MC-S99-8. CCSDS resolves to request the ISO/TC20/SC13 to progress the following documents to FDIS and IS.
- CCSDS 717.0-B-1 SCPS File protocol
- CCSDS 714.0-B-1 SCPS Transport Protocol
- CCSDS 713.5-B-1 SCPS Security Protocol
- CCSDS 713.0-B-1 SCPS Network Protocol

MC-S99-10. CCSDS resolves to request ISO/TC20/SC13 to process the CCSDS File Delivery Protocol, CCSDS 727.0-R-2, dated May 1999 as a Committee Draft (CD).

MC-S99-11. CCSDS resolves that the following CCSDS Recommendations, having been determined to be obsolete, shall be withdrawn and deleted from the list of current CCSDS documents. They shall, however, be placed in an OBSOLETE file in the CCSDS on-line database. The documents shall be flagged with the word OBSOLETE prominently displayed on the front cover:

AOS, Networks and Data Links, Abstract Data Type Library
CCSDS 705.1-B-1
AOS, Networks and Data Links, Formal Specification for Path Service
CCSDS 705.2-B-1
AOS, Networks and Data Links, Formal Specification for VCLC Service
CCSDS 705.3-B-1
AOS, Networks and Data Links, Formal Specification for VCA Service
CCSDS 705.4-B-1

MC-S99-12. CCSDS resolves that the following CCSDS Reports having been determined to be obsolete shall be withdrawn and deleted from the list of current CCSDS documents:
Introduction to CCSDS Cross Support, CCSDS 910.0-G-1
CCSDS Cross Support System Description, CCSDS 910.1-G-1

MC-S99-13. CCSDS resolves that the Heads of CCSDS Delegation are the appropriate entities to sign the Strategic Plan

MC-S99-14. CCCSDS resolves to release the Reference Model for an Open Archival Information System (OAIS) as CCSDS 650.0-R-1, dated May 1999. by July 31 with review period requested to be from 15 August to 15 October, 1999.

MC-S99-15. CCSDS resolves to request ISO/TC20/SC13 to process Reference Model for an Open Archival Information System (OAIS), CCSDS 650.0-R-1, to ISO DIS 14721

MC-S99-16. CCSDS resolves to place all Red Books on the CCSDS Web site with appropriate notices in their respective Forewords as to their degree of stability.

MC-S99-17. CCSDS resolves to release and distribute for agency review the following draft recommendations:
Efficient Utilization of the 2 GH/z Band for Space Operations
Use of the 8450-8500 MHz Band for Space Research
Definition of Category B (alignment with ITU)
Limits on Earth-to-Space Link Power Levels
Channel Frequency Plan for 2, 7, 8, 32 & 34 GAZ., Category B

MC-S99-18. CCSDS resolves to approve as inserts to the relevant Blue Books and to release and distribute the follow Recommendations:
Medium Rate Telecommand System
Maximum Permissible Phase and Amplitude Imbalances for Suppressed
Carrier (BPSK/QPSK) RF Modulators for Space to Earth Links
Category A

Maximum Permissible Phase and Amplitude Imbalances for Suppressed
Carrier (BPSK/QPSK) RF Modulators for Space to Earth Links,
Category B

MC-S99-19. The CCSDS resolves to approve as a new work item the definition of link parameters at 37-38 GH/z and to create an appropriate Working Group to produce a White Book in the 2001-2002 time period.

MC-S99-20. CCSDS resolves to reaffirm the following Blue Books as of May 1999:
SFDU Structures and Construction Rules, CCSDS 620.0-B-2
Control Authority Procedures, CCSDS 630.0-B-1
ASCII Encoded English, CCSDS 643.0-B-1

MC-S99-21. CCSDS resolves to notify ISO/TC20/SC13 that the following three CCSDS Recommendations have been reconfirmed as of May 1999:
SFDU Structures and Construction Rules, CCSDS 620.0-B-2; ISO 12175
Control Authority Procedures, CCSDS 630.0-B-1; ISO 13764
ASCII Encoded English, CCSDS 643.0-B-1; ISO 14962

MC-S99-22. CCSDS resolves to publish DEDSL: PVL concrete syntax as CCSDS 647.2-R-1 by July 31 with review period requested to be from 01 Sept to 30 October 1999.

MC-S99-23. CCSDS resolves to publish a revised PVL document as CCSDS 647.1-R-1 by July 31 with review period requested to be from 1 Sept to 30 October 1999

MC-S99-24. CCSDS resolves to accept the proposal of the European Space Administration (ESA) to host the Fall 1999 MC meeting in Frascatti, Italy on October 19-20. The TSG will also be hosted there on October 18; the individual panel meetings will be scheduled separately at dates and locations to be determined.

MC-S99-25. CCSDS resolves to accept the proposal of the French National Center for Space Studies (CNES) to host the Spring 2000 MC meeting in Toulouse, France on June 27-28. The TSG will also be hosted there on June 26; the individual panel meetings will be scheduled separately at dates and locations to be determined.

MC-S99-26. CCSDS resolves to consider the offer made by INPE to host the Fall 2000 meetings pending the outcome of the deliberations on the future CCSDS meeting schedule.

MC-S99-27. CCSDS resolves to thank Mr. Merv MacMedan and Ms. Pat McLane for their outstanding efforts in organizing this sizable and elongated meeting series and to thank the Jet Propulsion Laboratory for the excellent efforts in arranging this series of conferences.

ACTION ITEMS
CCSDS MANAGEMENT COUNCIL MEETING
17/18 May 1999
Newport Beach, California

NOTE: In the past, there has been some uncertainty as to the intent and purpose of some MC Action Items. This has lead to some actions not being acted upon until the following MC meeting which, of course, resulted in delays in responding. To avoid repeating this, Actionees are encouraged to make sure actions and resolutions are correct and clearly stated.

THE FOLLOWING ACTION ITEMS WERE CONTINUED FROM PREVIOUS MEETINGS:

98-6 The TSG shall develop a template for the panel reports to the MC that differentiates between active and inactive items in the work program, shows changes since the last report, panel document status, the schedule for the work, and any issues impacting panel production.

Assignee: TSG Chair
Due Date: Next MC Meeting

98-13 The TSG shall review the list of liaisons and determine the appropriate organizations and the appropriate persons to act as liaisons.

Assignee: TSG Chair
Due Date: Next TSG Meeting

98-16 The Agencies shall respond to the Agency CCSDS Utilization Questionnaire, which was provided as part of the Secretariat Mail-out Package for the Spring '98 meeting, letter dated 8 May '98.

Assignee: All Agencies
Due Date: Next TSG Meeting

98-19 The Agencies shall collect information on products developed within their respective countries and provide it to the Secretariat for inclusion in the CCSDS-Compatible Products database.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: To date, responses have been received from ESA, NASDA, NASA and BNSC

98-23 Review existing materials promoting CCSDS and develop recommendations for coordinating these elements into a cohesive marketing strategy.

Assignee: Mr. D. Townley, Dr. D. Giarerra, and Dr. E. Bergamini
Due Date: Next MC Meeting

98-32 Secretariat to draft statement explaining final draft status that would be included in stable red books.

Assignee: Secretariat
Due Date: Next MC Meeting
NOTE: Now that CCSDS Red Books are to be placed on the CCSDS Web Site, suitable statements shall be developed for all Red Books.

THE FOLLOWING NEW ACTION ITEMS WERE ESTABLISHED AT THIS MEETING:

99-1. Provide comments to Secretariat and Panel Chairmen on the P2 procedures with regard to processing non-CCSDS/external standards (included below).

"CCSDS endorses procedures developed by P2 to allow outside agencies to act as a maintenance agency for Mode 2 and Mode 3 documents. This may involve that agency's posting updates between official new versions of the document. Official releases of such documents, however, would require CCSDS approval."

Assignee: MC Members
Due Date: July 15
NOTE: The CEOS project requests an answer within two months.

99-2. Provide membership lists on line including links to members and associates web sites.

Assignee: Secretariat
Due Date: Best Efforts
NOTE: This is considered to be a low-priority effort.

99-3 Place all Red Books on the CCSDS web site and on CCSDS CD-ROMs. Each document shall contain in its FOREWORD appropriate text as to the stability of its technical content.

Assignee: Secretariat
Due Date: July 15

99-4 Remove references to Panel 4 from organization structure in CCSDS documentation and presentations.

Assignee: Secretariat
Due Date: July 15

99-5 In the CCSDS Web Site, include links to CCSDS related news articles

Assignee: Secretariat
Due Date: Best efforts
NOTE: This is considered to be a low-priority effort.

99-6 Each Agency should review the Fleet Chart and validate their respective mission(s) are CCSDS-compatible. Provide information on missions that are CCSDS-compatible but not shown.

Assignee: All MC Members/Observers as appropriate
Due Date: July 15

99-7 Furnish a picture of Mars Express to Mr. T. Gannett for inclusion in the Fleet Chart.

Assignee: ESA
Due Date: July 15

99-8 Confirm that the AR list on the Web is complete

Assignee: Secretariat
Due Date: July 15

99-9 Resend the CCSDS Utilization Questionnaire to CNES

Assignee: Secretariat
Due Date: July 15

99-10 Process the CCSDS Strategic Plan as follows:
-Comment on version 3.1 June 07
-Revise and distribute version 4 - June 21
-Comment of version 4 - July 5
-Revise and distribute version 5 - July 19
-Indicate Approval of version 5 - July 20
(Approval is to be by e-mail or electronic signature)

Assignee: Members/Observers/Working Group respectively
Due Date: As shown

99-11 Process the CCSDS Operating Plan as follows;
-Distribute Operating Plan, Version 2.1 - June 21
(Include matrix of tasks and priorities of interest)
-Return comments re Version 3 - July 19
-Distribute Operating Plan, Version 4 - August 21
-Return comments re Version 4 - September 20

Assignee: Members/Observers/Working Group respectively
Due Date: As shown

99-12 Panel Chairmen to review the CCSDS Operating Plan to assure that the panel Programs of Work in the Plan are complete. Provide information to the document editor on any work items (anticipated or existing) not currently reflected in the plan for inclusion in the document.

Assignee: Panel Chairmen
Due Date: July 19

99-13 Provide to the Secretariat a proposed letter to the IAA, re Action item 98-27, expressing concern about the proposed change in the name of one of their committees to Operations, Standards, Quality and Safety. This letter is to highlight the difference in the role of standards compared to quality and safety.

Assignee: CSA/Mr. A. Bastikar
Due Date: July 15

99-14 Put Art Work for the NASA booth on the Web for access by the other agencies to facilitate their development of a similar display capability.

Assignee: Mr. M. MacMedan
Due Date: July 15

Note to reviewers: Since none of the agency representatives present at the meeting indicated any intention of creating similar displays at this time, recommend this ACTION ITEM be eliminated to avoid an unnecessary expense to NASA.

99-15 Assign suitable experts to the Spacecraft On-Board Interfaces WG.

Assignee: Member and Observer Delegates
Due Date: July 15.

99-16 Re the IAF meeting in Brazil, determine the due date for papers and seek to establish a place on the agenda for CCSDS presentations on mission interoperability

Assignee: Dr. E. Bergamini
Due Date: July 15

99-17 Solicit papers for SpaceOps 2000 from your specific agency and coordinate the selection of those papers to be presented at the conference.

Assigned to: Member and Observer Delegates
Due Date: July 15 (Abstracts are due by Sept 30, 1999.

99-18 Provide recommendations and supporting information about new activities to be included in the CCSDS site under "It's Hot."

Assigned to: Panel Chairmen
Due Date: Continuing action

99-19 Resend to Members, the URL for the CCSDS-Compatible Products database.

Assignee: Secretariat
Due Date: July 15

99-20 Determine the outcome of the IAF planning session for the Amsterdam meeting with regard to “Standards”.

Assignee: Secretariat
Due Date: July 15

99-21 Propose ways to improve MC operations by way of reducing Agency travel budgets, reducing face-to-face meetings and increasing productivity with regard to the ESA proposed change in Methodology of CCSDS Operations.

Assignee: Members and Observers
Due Date: Next Meeting

99-25 Document editors and the respective panel chairmen shall determine when a Green Book can provide useful information and is, therefore, ready for release.

Assignee: Appropriate Document Editor and Panel Chairman
Due Date: As appropriate

ATTACHMENT A

AGENDA

CCSDS MANAGEMENT COUNCIL AGENDA
Newport Beach, California May 17-18, 1999

1. Call to Order (1300 hrs)
2. Introduction of Delegates
3. Welcoming Remarks
4. Agenda Review and Approval
5. Review of Minutes from Darmstadt, Germany
6. Secretariat Report
7. Review and Report of Open Action Items
8. Agency Reports
9. Summary Reports from Technical Panels
   - Panel 1
   - Panel 2
   - Panel 3
   - TSG
10. Report from Liaisons & Review of Liaison Relationships
11. Special Topics:
    - Strategic and Operation Plans, WG Report
    - Proposed Enhancements to CCSDS Home Page
    - Proposed Procedures Manual Changes
    - Proposed New GB "CCSDS-Compatible Products"
    - SC-13/14 Liaison
12. CCSDS Marketing Opportunities, including
    - Symposia in Europe, Space Ops 2000, IAF, COSPAR
13. Any New Business

    Mars Interoperability Workshop (Summary Report of May 12 Meeting and CCSDS Response
    Review of CCSDS Working Methodology
14. Planning for next TSG/MC Meeting
    - Currently: TSG on October 18
      - MC on October 19/20(AM)
15. Approval of Resolutions and Action Items
16. Adjourn

ATTACHMENT B

SECRETARIAT REPORT

CCSDS SECRETARIAT PACKAGE

CCSDS MANAGEMENT COUNCIL MEETING
Newport Beach, California USA
17-18 May 1999

- Directory of CCSDS Principal Delegates
- CCSDS Associates List
- CCSDS Document Register

DIRECTORY OF CCSDS PRINCIPAL DELEGATES April 1999

Instructions regarding telephone and facsimile dialing

The telephone and facsimile numbers listed in this directory are given in international format. The "+" sign at the start of each number refers to the whatever digits must be dialed in the country of origin in order to get an international access circuit. For calling within a country, this access code, the country code, and perhaps the city/area code should not be dialed.

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Revision Date: May 1999

Document Title	Date	Color	Number	Remarks
ADMINISTRATIVE				
CCSDS GSCID Field Code Assignment Control Procedures	**93-10**	**Blue**	**320.0-B-1**	
CCSDS GSCID Field Code Assignment Control Procedures	**96-11**	**Blue**	**320.0-B-1 Cor. 1**	**Corrigendum 1**
CCSDS GSCID Field Technical Specification for Code Assignment	96-09	White	321.0-W-1	On Hold
Procedures Manual for the Consultative Committee for Space Data Systems	**96-05**	**Yellow**	**A00.0-Y-7**	
CCSDS Strategic Plan-Volume 1: Vision, Mission, Strategic Goals	98-12	White	A01.1-W-2	
CCSDS Strategic Plan-Volume 2: Operating Plan for Standards Development	98-12	White	A01.2-W-2	
Achievements and Products	95-04	Yellow	A10.0-Y-5	Draft Yellow Book
An Introduction to CCSDS	98-08	Yellow	A10.1-Y-3.2	CCSDS Leaflet
CCSDS-Related Implementations	**96-11**	**Green**	**A12.0-G-1**	
CCSDS Publications Manual	**94-05**	**Yellow**	**A20.0-Y-1**	
CCSDS Glossary	**97-07**	**Green**	**A30.0-G-3**	
Report of the Management Council — Meeting Minutes, April 9-10, 1990	90-04	Yellow	B10.0-Y-1	
Report of the Management Council — Meeting Minutes, September 20-21, 1990	90-11	Yellow	B10.0-Y-2	
Report of the Management Council — Meeting Minutes, October 2-3, 1991	91-10	Yellow	B10.0-Y-3	
Report of the Management Council — Meeting Minutes, May 21-22, 1992	92-05	Yellow	B10.0-Y-4	
Report of the Management Council — Meeting Minutes, November 16-17, 1992	92-11	Yellow	B10.0-Y-5	
Report of the Management Council — Meeting Minutes, June 8-9, 1993	93-06	Yellow	B10.0-Y-6	
Report of the Management Council — Meeting Minutes, October 28-29, 1993, 1993	93-10	Yellow	B10.0-Y-7	
Report of the Management Council — Meeting Minutes, May 1993	94-05	Yellow	B10.0-Y-8	
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Report of the Management Council — Meeting Minutes, May 1996	96-05	Yellow	B10.0-Y-12	
Report of the Management Council - Meeting Minutes, November 1996	96-11	Yellow	B10.0-Y-13	
Report of the Management Council - Meeting Minutes, May 1997	97-05	Yellow	B10.0-Y-14	
Report of the Management Council — Meeting Minutes, November 1997	97-11	Yellow	B10.0-Y-15	
Report of the Management Council — Meeting Minutes, June 1998	98-06	Yellow	B10.0-Y-16	
Report of the Management Council — Meeting Minutes, November 1998	98-11	Yellow	B10.0-Y-17	

GSCID = Global Spacecraft Identification

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Document Title	Date	Color	Number	Remarks
PANEL 1 DOCUMENTS				
Telemetry Summary of Concept and Rationale	**87-12**	**Green**	**100.0-G-1**	
Telemetry Channel Coding	*84-05*	*Blue*	*101.0-B-1*	
Telemetry Channel Coding	*87-01*	*Blue*	*101.0-B-2*	
Telemetry Channel Coding	**92-05**	**Blue**	**101.0-B-3**	**Reconfirmed June 1998**
Telemetry Channel Coding	98-06	Pink	101.0-P-3.1	
Packet Telemetry	*84-05*	*Blue*	*102.0-B-1*	
Packet Telemetry	*87-01*	*Blue*	*102.0-B-2*	
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Packet Telemetry Services	**96-05**	**Blue**	**103.0-B-1**	
Lossless Data Compression: Summary of Concept and Rationale	**97-05**	**Green**	**120.0-G-1**	
Lossless Data Compression	**97-05**	**Blue**	**121.0-B-1**	
Telecommand Summary of Concept and Rationale	**87-01**	**Green**	**200.0-G-6**	
Telecommand Part 1 — Channel Service	*87-01*	*Blue*	*201.0-B-1*	
Telecommand Part 1 — Channel Service	**95-11**	**Blue**	**201.0-B-2**	
Telecommand Part 2 — Data Routing Service	*87-01*	*Blue*	*202.0-B-1*	
Telecommand Part 2 — Data Routing Service	**92-11**	**Blue**	**202.0-B-2**	**Reconfirmed June 1998**
Telecommand Part 2.1 — Command Operation Procedures	**91-10**	**Blue**	**202.1-B-1**	**Reconfirmed June 1998**
Telecommand Part 3 — Data Management Service	**87-01**	**Blue**	**203.0-B-1**	**Reconfirmed November 1995**
Time Code Formats	*87-05*	*Blue*	*301.0-B-1*	
Time Code Formats	**90-04**	**Blue**	**301.0-B-2**	**Reconfirmed November 1995**

CCSDS DOCUMENT REGISTER (BRIEF)

Revision Date: May 1999

Document Title	Date	Color	Number	Remarks
PANEL 1 DOCUMENTS (CONTINUED)				
Radio Frequency and Modulation Systems-Part 1: Earth Stations and Spacecraft[1]	**98-06**	**Blue**	**401.0-B**	
Radio Frequency and Modulation Systems-Part 1: Earth Stations and Spacecraft	98-06	Red	401.0-R	
Radio Frequency and Modulation—Part 1: Earth Stations	**97-05**	**Green**	**411.0-G-3**	**Published electronically, hardcopy not yet available**
Radio Frequency and Modulation Systems—Spacecraft-Earth Station Compatibility Test Procedures	**92-05**	**Green**	**412.0-G-1**	
Report of the Proceedings of the RF and Modulation Subpanel Meeting at the Ames Research Center, April 11-20	89-09	Green	421.0-G-1	
Proceedings of the CCSDS RF and Modulation Subpanel 1E Meeting at the German Space Operations Centre September 20-24, 1993	93-10	Yellow	B20.0-Y-1	
Advanced Orbiting Systems, Networks and Data Links: Summary of Concept, Rationale and Performance	**92-11**	**Green**	**700.0-G-3**	
Advanced Orbiting Systems, Networks and Data Links, Architectural Specification	*89-10*	*Blue*	*701.0-B-1*	
Advanced Orbiting Systems, Networks and Data Links: Architectural Specification	**92-11**	**Blue**	**701.0-B-2**	**Reconfirmed June 1998 for one year**
Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services	**94-05**	**Blue**	**704.0-B-1**	
Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services	**94-05**	**Green**	**704.1-G-3**	
Advanced Orbiting Systems, Networks and Data Links: Formal Definition of CPN Protocols, Methodology and Approach	**93-10**	**Green**	**705.0-G-2**	
Advanced Orbiting Systems, Networks and Data Links: Abstract Data Type Library—Addendum to CCSDS 701.0-B-2	**94-05**	**Blue**	**705.1-B-1**	
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the Path Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**Blue**	**705.2-B-1**	
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCLC Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**Blue**	**705.3-B-1**	
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCA Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**Blue**	**705.4-B-1**	

[1] Earlier issues of 401.0-B have been omitted from this list for the sake of brevity.

CCSDS DOCUMENT REGISTER (BRIEF) **Revision Date: May 1999**

Document Title	Date	Color	Number	Remarks
PANEL 1 DOCUMENTS (CONTINUED)				
Space Communications Protocol Specification (SCPS)— Rationale, Requirements, and Application Notes	97-06	Green	710.0-G-0.3	Draft Green Book
Space Communications Protocol Specification (SCPS)— Users Guide (SCPS-UG)	97-09	Green	711.0-G-0.2	Draft Green Book
Space Communications Protocol Specification (SCPS)— Network Protocol (SCPS-NP)	97-09	Red	713.0-R-3	
Space Communications Protocol Specification (SCPS)— Security Protocol (SCPS-SP)	97-09	Red	713.5-R-3	
Space Communications Protocol Specification (SCPS)— Transport Protocol (SCPS-TP)	97-09	Red	714.0-R-3	
Space Communications Protocol Specification (SCPS)— File Protocol (SCPS-FP)	97-09	Red	717.0-R-3	
CCSDS File Delivery Protocol: Summary of Concept and Rationale	98-08	Green	720.7-G-0.3	Draft Green Book
CCSDS File Delivery Protocol (CFDP)	99-03	Red	727.0-R-2	

CCSDS DOCUMENT REGISTER (BRIEF)

Revision Date: May 1999

Document Title	Date	Color	Number	Remarks
PANEL 2 DOCUMENTS				
Space Data Systems Operations with Standard Formatted Data Units: System and Implementation Aspects	**87-02**	**Green**	**610.0-G-5**	
CCSDS Panel 2 Methodology for Development of Recommendations	98-06	Yellow	611.0-Y-1	
Standard Formatted Data Units -- Structure and Construction Rules	*88-02*	*Blue*	*620.0-B-1*	
Standard Formatted Data Units — Structure and Construction Rules	**92-05**	**Blue**	**620.0-B-2**	**Reconfirmed June 1998 for one year**
Standard Formatted Data Units — Structure and Construction Rules	**96-11**	**Blue**	**620.0-B-2 Cor. 1**	**Corrigendum**
Standard Formatted Data Units — A Tutorial	**92-05**	**Green**	**621.0-G-1**	
Standard Formatted Data Units — Referencing Environment	**97-5**	**Blue**	**622.0-B-1**	
Standard Formatted Data Units — Control Authority Procedures	**93-06**	**Blue**	**630.0-B-1**	**Reconfirmed June 1998 for one year**
Standard Formatted Data Units — Control Authority Procedures Tutorial	**94-11**	**Green**	**631.0-G-2**	
Standard Formatted Data Units — Control Authority Data Structures	**94-11**	**Blue**	**632.0-B-1**	
Parameter Value Language Specification (CCSD0006)	**92-05**	**Blue**	**641.0-B-1**	**Reconfirmed June 1998 for one year**
Parameter Value Language — A Tutorial	**92-05**	**Green**	**641.0-G-1**	
Language Usage in Information Interchange Tutorial	**89-10**	**Green**	**642.1-G-1**	
ASCII Encoded English (CCSD0002)	**92-11**	**Blue**	**643.0-B-1**	**Reconfirmed June 1998**
The Data Description Language EAST Specification (CCSD0010)	**97-05**	**Blue**	**644.0-B-1**	
The Data Description Language EAST — A Tutorial	**97-05**	**Green**	**645.0-G-1**	
The Data Description Language EAST — List of Conventions	**97-05**	**Green**	**646.0-G-1**	
Data Entity Dictionary Specification Language (DEDSL) (CCSD0011/CCSD0012)	96-11	Red	647.0-R-1	

CCSDS DOCUMENT REGISTER (BRIEF)

Revision Date: May 1999

Document Title	Date	Color	Number	Remarks
PANEL 3 DOCUMENTS				
Introduction To CCSDS Cross Support	**90-06**	**Green**	**910.0-G-1**	**Expected to be withdrawn by Panel 3**
CCSDS Cross Support System Description Volume 1	**90-06**	**Green**	**910.1-G-1**	**Expected to be withdrawn by Panel 3**
Standard Terminology, Conventions, and Methodology (TCM) for Defining Data Services	**94-11**	**Green**	**910.2-G-1**	
Cross Support Concept — Part 1: Space Link Extension Services	**95-05**	**Green**	**910.3-G-1**	
Cross Support Reference Model Part 1: Space Link Extension Services	**96-05**	**Blue**	**910.4-B-1**	
Space Link Extension—Return All Frames Service Specification	97-11	Red	911.1-R-1	
Space Link Extension—Return Virtual Channel Frames Service Specification	97-11	Red	911.2-R-1	
Space Link Extension—Forward CLTU Service	97-11	Red	912.1-R-1	
Space Link Extension—Forward Space Packet Service Specification	97-11	Red	912.3-R-1	
PANEL 4 DOCUMENTS				
Radio Metric and Orbit Data	**87-01**	**Blue**	**501.0-B-1**	**Reconfirmed May 1994**

ATTACHMENT C

BNSC REPORT

BNSC Report to the CCSDS Management Council 17-18 May 99

BNSC support to CCSDS appears stable. Funding from the UK Research Councils has been approved for 99/2000 and the DERA contract negotiations for a slight increase in funding from that source are progressing satisfactorily. Also the Ministry of Defence support and interest remains firm. Therefore we predict resources at the level of 2 staff years per year with the possibility of additional funding in support of the Strategic Plan initiatives, particularly in the areas of turbo codes, security and payload interfaces.

We have supported the generation and review of the CCSDS Strategic Plan including the canvassing of views from the UK community. This is considered to be a good and bold plan by BNSC and we have indicated those areas where our priorities lie. In addition to the work areas of Panel 2, including archiving, BNSC would wish to support and give priority to turbo codes, security, SLEs and the work of the new panel on payload interfaces. More details about the formation of this new panel and its members is sought.
BNSC comments have also been provided on Draft 2 of the Strategic Plan.

Panel 1

The BNSC work here has been particularly in the areas of the new file transfer protocol, turbo codes, data compression and security issues. We continue to participate in the Ad-hoc Working Group on Security. We are pleased to see that Panel 1 are able to include inputs and participation from UK industry on turbo codes and BNSC will in turn monitor their participation.

Panel 2

BNSC awaits the release of the Archive Reference Model and the DEDSL as red books and trusts that these will be approved at these meetings. The Catalogue Interoperability Protocol (CIP) has been adopted as a white book by the panel and BNSC have funded work to provide examples of how this protocol can be used for non-earth observing missions thus responding to the panel concern that the CIP was Earth Observing specific and not of a sufficiently general application. BNSC is anxious for this protocol to progress quickly through panel 2 on to SC13.
Work has continued on the production of JAVA routines to interface between the objects within the Panel 2 domain and we hope to see this type of work taken on and co-ordinated across the panel members.

Panel 3

BNSC suuports the work of the panel and UK industry has been employed to assist with the specification writing for the SLE Services. Of particular note is the now strong proposal (funding has been sought) for the UK to implement some of the SLE services (i.e. Return all Frames and Forward CLTU) within the UK STRV programme. The initial step will be to put in place an architectural design and scenarios followed by implementation utilising the software developed for ESA as part of the Integral programme.

Meetings and Workshops

The 5th CCSDS UK Workshop on "New Technologies, New Standards" was held at the IEE, Savoy Place, London on 9.11.98. In spite of some problems with the IEE advertising of the event it was a very successful workshop. The IEE produced a digest of the presented papers- Reference No 1998/519.

Conformance and Type Testing

One of the papers at the 5th CCSDS UK workshop was on "Independent Assessment of Standards" and the workshop recognised its importance and made a resolution to encourage the development of a plan for conformance testing of our recommendations within the CCSDS. Thus, the BNSC would like to raise this issue again within this MC meeting.

ACE and STRV

ACE operations continue at RAL providing good experience and reliability from the CCSDS compatible AVTEC decoder. Within the STRV programme we will be using at both RAL and DERA the CCSDS compatible Telecommand and Telemetry Processors built by ESYS Ltd. within our ground stations.

P. Vaughan 26.4.99

ATTACHMENT D

CSA REPORT

No report available.

ATTACHMENT E

CNES REPORT

CNES REPORT
CCSDS MANAGEMENT COUNCIL
NEW PORT BEACH MAY 1999

INTRODUCTION

- CNES maintains its interest for CCSDS activities.
- CNES has participed in CCSDS meetings in Newport (panels 1 A, 1F, 1E ,1J , 2 , 3 and Mars workshop .)
-CNES continues to provide the chairmanship of Panel 3 and the chairmanship of ISO/TC 20/ SC 13 .
–The CNES manpower involved in CCSDS activities was maintains at a constant level :

4 man years

This effort will be difficult to maintains in the futur .

.-In the futur, the main criteria for CNES participation in CCSDS working groups will be the applicability of new recommandation to identified project (national or international in cooperation).

NEW IMPLEMENTATION OF CCSDS RECOMMANDATIONS

-For Mars Sample Return project (in cooperation with J P L),at the preliminary specifications level ,the CCSDS is the base -ligne for TM-TC design .

–For the new micro –satellite family ,CNES uses :
-Telemetry CCSDS recommendations at levels packet,frame and coding
-Telecommand CCSDS recommendations at levels frame and coding .

–CNES uses CCSDS recommendation 121 .0-B-1 ″ Lossless data compression ″ for SPI payload taking on board of ESA satellite INTEGRAL .The compression is performed by a on board software .

CNES SUPPORT TO CCSDS ACTIVITIES

- CNES has supported the review of following Red Book :

- 647 .0-R-1 Data entity dictionary Specification language . CNES manages this review .

-727 .0-R-2 CCSDS File Delivery Protocol (C FD P)
(2 technical facts ,8 recommendations ,1 editorial)

- 101 .0-P-1 Telemetry Chanel Coding .CNES approves without comment .

-**Strategic Plan** CNES has supported the review of Strategic Plan and forwarded some comments .

-CNES activities into Panels are the following:

Panel 1 A

- CNES continues to support panel 1 A by participation in working meetings

-CNES has actively supported the subpanel ″Lossy Image Compression ″ and has proposed an algorithm for compression .In order to compare this solution with other proposal from ESA and NASA, CNES has performed evaluation tests .

- CNES has proposed a new standardisation based on Chanel Codes with limited overhead .

–CNES has supported the review of the Pink Book ″Telemetry Chanel Coding ″.

– CNES has provided the French translation of :
CCSDS 121-0-B-1 Lossles data compression
CCSDS 103- 0- B1 Packet Telemetry Services

Panel 1 E

-CNES has actively supported activities of panel 1 E .

For the special workshop on standards for Mars mission interoperability, CNES supported a presentation about ″ Mars proximity Link Data Rates and Frequencies ″

Panel 1 F

-CNES continues to support panel 1 F meetings .

-CNES has reviewed the red book 727-0-R-2 File Transfer Packet Protocol (CFDP)

-CNES has supported the process for CFDP implementation and evaluation .

– CNES does not have the resources to review the four issue-3 SCPS Red Book

Panel 1 J

- CNES has actively supported the panel P 1 J .

-CNES has analysed a proposal from CEOS ″Standard Sensor Description Format for Earth Observing Dynamic Sensors″ in order to define the contains of attitude data package compatible with users needs .A draft of new recommendation is under preparation for the working group .

Panel 2

-CNES has actively supported all activities of Panel 2 .

- CCSDS 647.0-R-1

We have worked mainly as the editor of the DEDSL (Data Entity Dictionary Specification Language) Abstract Syntax Red Book .Several teleconferences with NASA,ESA and BNSC have been held on the subject. Comments from NASA and BNSC have been taking into account .Three revisions of the document have been produced since the Toulouse workshop.

We have also prepared the DEDSL PVL Syntax White Book which corresponds to the first implementation (in PVL Language) of the previous recommendation,and which should be issued with it and discussed at Newport Beach .
A Tutorial Green Book, companion of the DEDSL PVL Syntax, is under preparation
.

- CNES has provided the French translation for :
  644-0-B-1 Language E A S T Specification.
  French version forwarded to ISO end of November.

PANEL 3

- CNES continues to support Panel 3 .
  with a lot of difficulties because manpower for Panel 3 is decreasing .
- CNES actively supported WG1 meetings in Washington and Darmstadt
  for the review of the White Book ″ SLE Service management Specification″ 910-5W.19
- CNES actively supported WG 2/3 meeting in Washington and has prepared the proposal for a draft book margin the ″ SLE Return Services Specification ″ .
- CNES has actively supported P 3 meetings in Newport Beach

QUESTIONNAIRE

- Via BNAE , CNES has provided French Space Industrie with copie of the questionnaire requesting input for the CCSDS Inplementation Green Book .
  To day we don't have received response .

OTHER SPACE STANDARDISATION ACTIVITIES

-CNES is working for ECSS (European Cooperation for Space Standardisation) ,notably in drafting group E 70 Space Engineering Ground Systems and Operation .The ECSS Document E 70 Draft 12 approved by ECSS Technical Panel has been forwarded to CCSDS secretariat for information.

-In ISO/TC20/ SC 14 /WG 3 CNES is involved in following drafting groups :
WD 14620 Launch Operations (in D I S)
WD 14950 Satellite Operability (New issue from 28/02/99 in review by SC/14)
WD 14711 Space System .Mission Operations Concept Checklist (new issue)

ATTACHMENT F

DLR REPORT

DLR- GSOC
Status Report to the CCSDS Management Council at
ESA-ESOC
November 1998

1 INTRODUCTION

DLR-GSOC continued its work within the reporting period with emphasis on the work of panel 3. DLR was active in implementations of control centre software for CCSDS missions in the TM/TC area, to support routine operations at GSOC.

2 PANEL RELATED REPORT

2.1 PANEL 1

- Panel 1E: RF/Mod:
  DLR continued to stay in an active role in Panel 1E. Within the reporting period, support was given in the analysis of the position papers for the bandwidth saving modulations method. An analysis on the method of synchronisation for turbo codes, used at very low SNR, was supported. A comparison of several studies in the area of modulation methods for high data rates is in progress. A report was done on the BIRD uplink modulation methods done at GSOC.

- Panel 1J, Navigation:
  DLR-GSOC in its role of being a central node in Europe and relying on other agencies' navigation data is interested in P1J's work. It therefore is participating in the P1J work in a monitoring role. Apart from this interest in standardising the tracking formats in use for S/C operations for cross support, GSOC's interest is also based on its involvement in the definition of the ground system of the future European GNSS2 navigation satellite system, which will lead to a definition of a future GNSS2 navigation data format to be standardised.

- All other Panel 1 Sub-Panels:
  DLR stayed in a monitoring role.

2.2 PANEL 2

No activity by DLR.

2.3 PANEL 3

DLR-GSOC is chairing the WG2/3. Besides coordinative work, DLR is responsible as an editor for the Forward TC Frame Book, which went through two editing cycles since last meeting. The book should go red in July 1999, to be ready for agency review. DLR is working on the European part of the Space Station and will put emphasis on use of the SLE-services for ground delivery services. The requirements for these are under definition.
In the modernisation effort for the DLR-Weileim ground station, DLR is planning to establish SLE services. For optimisation of this effort, a coordination of all development plans for implementation of SLE software within the CCSDS community, is highly encouraged.

2.4 TSG

DLR-GSOC continued to support the work of TSG. In the view of the strategic plan and lacking manpower in all the agencies, DLR is highly concerned about the impacts of additional work envisaged by this plan in the time periods mentioned. When selecting tasks out of this plan for future work, an as much as possible common view of all agencies on the resulting work and its manpower impacts has to be carefully done.

3 DLR-GSOC CCSDS MISSIONS

The following missions will be supported in future with the following CCSDS features (ABRIXAS in orbit):

Project	*Launch*	*Uplink*			*Downlink*		
		Packets	*Frames*	*Code*	*Packets*	*Frame*	*Code*
ABRIXAS	5/99	Y	Y	Y	Y*	Y***	Y**
EUTELSAT (3/4)	6,8/99	Y	Y	Y	N	Y	Y**
CHAMP	1/00	Y	Y	Y	Y*	Y	Y**
BIRD	3/01	-	-	-	Y	Y	-
GRACE	1/00	Y	Y	Y	Y*	Y	Y**

* : no segmentation
** : no R-S coding
*** : no 1st header pointer for VC-dump

software to support these missions exists to a high extent. Some details are mentioned as follows:

Eutelsat W24:

Telemetry: only transfer layer is used.
Telecommand: the full packet standard is used

CHAMP CCS:

Telemetry: fully compliant including the packet layer. Software was developed supporting:

- Transfer Frame Validation (check of counters and check bytes)
- Virtual Channel Demultiplexing
- CLCW Extraction
- Source Packet Extraction

TC System: fully compliant

CHAMP MOS:

1. Telemetry: Transfer and Packet Layer Processing
2. TC: see CHAMP CCS

ABRIXAS:
TM / TC as Champ – but special processing of dump data necessary (no first header pointer available)

None of the projects uses Reed-Solomon Coding, only check bytes in the transfer frames.

H. Wanke / M. Drexler
CCSDS Representatives
DLR- GSOC

ATTACHMENT G

ESA REPORT

Report of ESA delegation
To the CCSDS Management Council
Newport Beach, CA, May 17,1999

General:

The ESA delegation wishes to explain the reasons for the lower than usual attendance of its technical staff at the current round of CCSDS panel and subpanel meetings. The reduction was mainly caused by increasing pressure on the financial resources available for intercontinental travel. From the original number foreseen, which would have covered all panels, a selection had to be made, which left at least two panels/subpanels with inadequate attendance from ESA staff. ESA realises and regrets, that work progress was consequently impaired by the absence of the ESA experts, who were to review with the international community the documents produced by them.

ESA wishes to emphasize, that it continues to be committed to fully support the activities of CCSDS.

In order to minimise the impact of the ever increasing travel problem, ESA proposes two sorts of remedial actions:

For the immediate term, ESA proposed to arrange for the next months special editing sessions to work on those items and documents, which were delayed by ESA's abscence. A detailed proposal was made to panel 3 with a work plan to recover the time schedule for the critical work on some SLE services needed for upcoming projects (Integral).

For the longer term ESA tables a proposal how to conduct and arrange meetings in the future in a different way and to efficiently execute work in order to use optimally the available resources and minimise travelling.

Support by ESA to CCSDS panel work:

ESA continues to support actively all panels and subpanels of CCSDS and is directly involved in the production of all major books. Obviously, due to limitation of resources, priorities have to be set and subjects of higher interest to ESA's work programme are more actively supported than others. Within the infrastructure directorate more than 20 individuals work directly on preparation or implementation of CCSDS recommendations and a total of about 6-7 man years is spent on CCSDS related standardisation activities by ESA staff, in addition to work by contractor staff.

Implementation of CCSDS recommendations:
ESA continues its policy to implement CCSDS recommendations in its infrastructure and basically for all its future missions. Specifically, for Integral Rosetta and Mars Express a large set of SLE recommendations are being implemented. In this context ESA is concerned about rumors, that due to rearrangements within NASA the SLE services might not be implemented either in time or at all. This would have quite some negative impact on the credibility of CCSDS and its endevour to provide standards for international interoperability.
ESA has adapted its policy to develop internal standards within the ECSS scheme, leading to international European Standards being applied by all European Space Agencies and the European industry. In this context CCSDS recommendations will basically be proposed to ECSS as new standards as they were developed within CCSDS. This applies in particular to all Space Communications standards as developed by Panel I but will most probably also apply to the SLE services of Panel 3 and to recommendations of Panel 2 (e.g. the Control Authority Office).

Benefits of CCSDS cooperation for ESA:
The ESA delegation acknowledges the advantages and the benefits the cooperation with CCSDS agencies offers, in addition to the high potential for interoperabflity and consequent cost savings standards will bring about, The easier data exchange, stimulating technical cooperation and the exchange of views within the panels allows to share the cost of research with the other agencies.
The active cooperation with the other agencies permits important agreements to be reached in a very short time frame, such as the proximity Link Protocol Standard for Mars missions planned for the next years by several agencies.

ATTACHMENT H

INPE REPORT

INPE Report
to the
CCSDS Management Council
Newport Beach, Ca, USA
18 May, 1999

The support of INPE to the CCSDS is reaffirmed.

As previously pointed, it is becoming more evident with time that a major adherence of INPE to the adoption of the CCSDS Recommendations in its pertinent space data systems will gradually result from the widespreading of the availability of COTS products and services that are expected to be increasingly offered by the international aerospace private and government enterprise. On the other side, the current (since1998) initiative of the Brazilian Space Agency (AEB) through the Brazilian Association of Aerospace Industries (AIAB), in promoting the culture and adoption of aerospace standards, with the support of the Brazilian Association of Technical Standards (ABNT) is also an increasing and very significant move which is already reflecting a clearly increased impact in the Brazilian aerospace community, as a whole, toward the adoption of aerospace standards in the Brazilian space missions, in general, in all segments. In this case, the achievements of the SC-13 and SC-14, TC-20, ISO Subcommittees are being carefully and heavily observed and followed as a source of standardization of the pertinent Brazilian aerospace activities.

Very recently, INPE Directorship addressed the considered pertinent many segments of the institution in an open and detailed explanation and placed clear request for their serious considerations in the process of adherence to the CCSDS Recommendations, in the realm of their specific space missions. This is naturally the case, inclusive, of the many satellite development programs, besides those related to the ISS initiative, with which INPE is also heavily involved.

In another aspect of INPE commitments with the CCSDS effort, concommittantly with its increasing involvement with the SC-13 and SC-14, TC-20, ISO work, its is becoming gradually possible to involve, on behalf of INPE, a competent technical body of expertees which is certainly willing to colaborate with their pertinent professional specializations in the development of CCSDS Recommendations. The pertinent CCSDS Panels and Subpanel Chairmen are gradually getting acquainted with this initiative, on a case-by-case basis. There is a very good perspective in this direction, to start with, in the revision process of the many CCSDS documents, in electronic form.

EDUARDO W. BERGAMINI
INPE Principal Delegate to CCSDS

São José dos Campos, May 1999.

ATTACHMENT I

ISAS REPORT

ISAS REPORT TO CCSDS MANAGEMENT COUNCIL
Newport Beach, California, USA, May 17-18, 1999
Takahiro Yamada

1. IMPLEMENTATION OF CCSDS RECOMMENDATIONS

1.1 ONBOARD

Spacecraft	Mission	Launch Year	TLM Pkt	TLM Frm	TLM Code	TC Pkt	TC Frm	TC Code
PLANET-B	Mars orbiter	1998		✓	✓			
LUNAR-A	Lunar penetraters	1999		✓	✓			
ASTRO-E	X-ray telescope	2000	✓	✓	✓			
MUSES-C	Asteroid sample return	2002	✓	✓	✓	✓	✓	✓
ASTRO-F	Infrared telescope	2003	✓	✓	✓			
SOLAR-B	Solar observatory	2004	✓	✓	✓	?	?	?

1.2 GROUND

Complex	Function	TLM Pkt	TLM Frm	TLM Code	TC Pkt	TC Frm	TC Code
SSOC	Spacecraft Control Center	O	O	-	U	U	U
KSC	Ground Station (Near Earth)	O	O	O	U	U	-
UDSC	Ground Station (Deep Space)	O	O	O	U	U	-

O: Operational, U: Under development

ISAS plans to use SLE services for data transfer between ISAS and JPL for MUSES-C (probably RAF and CLTU services). SLE services will be supported by a gateway at SSOC (Sagamihara Space Operations Center) of ISAS.

2. PANEL ACTIVITIES (From October 1998 to April 1999)

2.1 PANEL 1

ISAS supported most activities of Subpanels 1A and 1F.

ISAS is editing the following Draft White Books:

Space Data Link Protocol, Synchronous 1 (Conventional TM Frames),
Space Data Link Protocol, Synchronous 2 (AOS Frames),
Space Data Link Protocol, Asynchronous 1 (TC Frames),
Space Path Protocol,
Command Operation Procedure-1,
Channel Coding and Synchronization.

The first five Draft White Books are complete and have been distributed to Panel members for review.

ISAS is planning on editing the following Draft Green Books:

Space Path Protocol,
Space Data Link Protocols.

ISAS reviewed the following documents and submitted RIDs and comments:
- CCSDS File Delivery Protocol Red Book 2,
- Telemetry Channel Coding Pink Sheets,
- Space Data Link Protocol, Proximity 1.

2.2 PANEL 3

ISAS fully supported activities of Working Groups 1 and 4.
ISAS reviewed the following documents and submitted comments:
- SLE Service Management White Book,
- Management Parameters of SLE Services.

2.3 Management Council and Technical Steering Group

ISAS reviewed the following document and submitted comments:
- CCSDS Strategic Plan (Volumes 1 and 2).

3. STUDY ACTIVITIES

ISAS is performing study activities related to CCSDS in the following areas:
- Space link addressing,
- Space link protocols to support QoS requirements,
- High performance file transfer protocol,
- Standard format for mission data bases.

4. AVAILABLE MANPOWER RESOURCES

Only one person is available at ISAS for supporting CCSDS activities, and he does this work on a part-time basis. The manpower available to support CCSDS in this year (1999) is 1/2 man-year.

ATTACHMENT J

NASA REPORT

CCSDS Management Council:
NASA Report
Newport Beach, California, USA, 17 May 1999

Adrian J. Hooke
Manager, NASA Space Mission Operations Standards Program

Personnel Changes

At NASA Headquarters, in the Office of Space Flight (which is the programmatic home of the NASA Standards activity) the personnel situation had been rather stable up until the last month. Mr. Bill Readdy, Director of Operations, will assume the additional position of Deputy Associate Administrator, under Mr. Joe Rothenberg. Mr. Norman B. Starkey will be placed in a new position as Dir. of Shuttle Operations, reporting to Mr. Readdy. Mr. Starkey was previously the Executive director of the Aerospace Safety Advisory Panel within Headquarters. Mr. Robert Spearing is Mr. Readdy's deputy for Operations and also serves as the Director of Space Communications, with a strong interest in the NASA standards program that supports CCSDS.

Headquarters is coordinating NASA planning for a high level (Mr. Spearing will lead the NASA delegation) international 'Interoperability Plenary' session to be held in Paris on June 21-22, 1999. The primary focus will be on ground stations and the applicability of CCSDS to interoperability is expected to be a major consideration at this meeting. Participating agencies include NASA, ESA, ASI, CNES, DLR, NASDA and ISAS.

In the Space Operations Management Office (SOMO) at Johnson Space Center, Lockheed-Martin Space Operations Corporation (LMSOC) has been awarded the Consolidated Space Operations Contract (CSOC) to manage and operate NASA's ground infrastructure. Mr. Richard Schell is the CSOC Systems Engineering manager and Mr. John Nelson is the CSOC Chief Architect. We are currently developing new relationships with these individuals and their team members.

At JPL, Mr. Wallace Tai has been appointed as Acting Manager of a new Systems Engineering Office in the Telecommunications and Mission Operations Directorate (TMOD). The JPL Standards Program managed by Mr. Merv MacMedan will move into Mr. Tai's new organization. This elevation of the standards program at JPL is highly encouraging and is indicative of the strong commitment to standards by the JPL Director for TMOD, Mr. Gael Squibb.

Reflecting an ongoing era of change at GSFC, we are also attempting to re-energize and organize the Center's standards office. A significant item has been a recent proposal to use the WIRE spacecraft to demonstrate the effectiveness of CCSDS protocols.

ISO 9000 certification

The Enterprises within NASA Headquarters are in the final stages of gaining certification under ISO-9000. The final audit is being conducted May 17, 1999. We have included the Standards program process as one of the key processes in the Office of Space Flight.

International Telemetering Conference

NASA supported the ITC/USA 98 conference, which was held from Oct 25-29, 1998 in San Diego, CA, by establishing and staffing a CCSDS information booth. From a CCSDS perspective, the ITC was a tremendous success and the booth received almost continuous traffic. NASA personnel gave out over 300 CD-ROMs. The "awareness" of CCSDS was at an all-time high. People were coming up and asking what CCSDS was all about because they were seeing the term throughout the show.

Deployment and application of CCSDS

NASA is pleased to note that over 100 spacecraft are now using CCSDS recommendations. We are also encouraged by the growing number of commercial implementations of CCSDS-conformant products and systems. Mr. Tom Gannett has been assembling an online data base of this information, which is available at http://hope.gsfc.nasa.gov/ccsds/implementations/

Consolidated Space Operations Contract (CSOC)

As part of NASA's strategy to transition routine space operations to the private sector, the CSOC was awarded to Lockheed Martin on September 25, 1998. During the Phase-in period we have been working intensively with the contractor to correct areas of their Integrated Operations Architecture (IOA) that we felt displayed a lack of understanding of CCSDS and its achievements. In fact, this effort has consumed much of our energies during this last work-period. We participated in a series of workshops in Houston during the early part of the Spring where we attempted to understand the issues and to educate the contractor. While we generally applaud the move towards integrating space missions more closely with the terrestrial Internet, the contractor's proposal to move towards an "IP-over-ATM" protocol architecture for the space link has been vigorously resisted as being technically immature. We have also been active in raising the contractor's awareness that NASA has major international commitments and that CCSDS has played a leading role in developing inter-agency cross-support techniques. The contractor has adopted a position that they are a "customer for standards" rather than a developer, although we feel strongly that they should actively participate in the CCSDS process. Negotiations are therefore underway to identify how to integrate the CSOC into the NASA standards program.

Budget

At present, the annual NASA budget (from all sources) is level at approximately $3.6 million, which translates into approximately 2 full time equivalent NASA Civil Service employees and 13 full time equivalent NASA-JPL and Contractor staff. The budgeting process for the next US Fiscal Year (October 1999 - September 2000) has not yet been completed but there is a very low probability that our mainstream resources will increase. In response to recent budget reductions, the Space Project Mission Operations Control Architecture (SuperMOCA) task was terminated at the end of March 1999.

Since we expect that there will in fact be continuing pressures to reduce budgets in this area, we are actively working to diversify our sponsorship and to seek new sources of funding. We feel that the international program of Mars exploration may well be a promising source of new standards sponsorship across all CCSDS Agencies.

The International Assault on Mars

Mission planning for an exciting series of international missions to Mars - the "Mars Armada" - has been proceeding at a rapid pace. NASA hopes to support this armada by deploying communications and navigation satellites around the planet to provide data relay and positioning services. We have been extremely active in all areas of the Mars program, with particular emphasis on internetworking aspects via our "Interplanetary Internet" thrust. We organized a "Mars Internet" workshop in March 99 that was well-attended by senior and respected members of the Earth's Internet community. We organized a "Special Workshop on Mars Mission Interoperability" in May 99 to identify the needs for dealing with cross-support aspects of so many missions, and to highlight the critical role of CCSDS in providing standardized capabilities. The international Mars program is expected to become a major component of the scientific exploration of space in the near future. Much like the Space Station of a decade ago, it is a program that desperately needs the capabilities being developed by CCSDS. NASA encourages all agencies to become involved with their Mars program planning activities and to advance the utilization of CCSDS-based standards across the programs.

-o-o-o- end -o-o-o-

ATTACHMENT K

NASDA REPORT

NASDA STATUS REPORT

CCSDS MC (Newport Beach May 17-18th, 1999)

NASDA
NATIONAL SPACE DEVELOPMENT AGENCY OF JAPAN

NASDA CCSDS Activity Report after the last MC meeting.
Implementation of the Recommendation
1) ONBOAD

-ETS-VII (Rendezvous docking and robotics; Launched in Nov., 1997)
Uplink –Telecommand / Downlink - AOS
We have received AOS telemetry and transmitted telecommand normally.
-TRMM (Precipitation Radar; Launched in Nov., 1997)
Uplink – telecommand / Downlink – AOS

-ADEOS-II (Earth Observation Satellite; Launch in 2000)
Downlink – AOS

-JEM (Space Station; Launch in 2001)
Uplink – AOS / Downlink – AOS

-HTV (H-2 Transfer vehicle; Launch in 2002)
Uplink – Telecommand / Downlink – AOS

-ETS-VIII (Engineering Test Satellite; Launch in 2002)
Uplink – Telecommand / Downlink – AOS

-ALOS (Land Observation Satellite; Launch in 2003)
Uplink – Telecommand / Downlink – AOS

-SELENE (Selenological & Eng. Explorer; Launch in 2003)
Uplink – Telecommand / Downlink – AOS

2) Ground System

< Space Network >
- Currently, Experimental Packet Processor (EPAP) for ETS-VII space link is processing AOS TLM and Telecommand.
- CCSDS packet data processing equipment for JEM is now under development. This equipment will be installed in the DRTS (Data Relay Test Satellite) space network BBE located in Tsukuba.

< Ground Network >
- We have started the design phase of the next generation general purpose ground station that can cope with wide range of CCSDS recommendations.

NASDA STATUS REPORT

CCSDS MC (Newport Beach May 17-18th, 1999)

2.PANEL ACTIVETIES

Panel 1
-Supporting all P1 activity.
-Review CFDP Red-2, RF & Mod. & Telemetry Channel Cording Pink sheets.

Panel 2
-Supporting P2 activity.
-NASDA Reviewed OAIS Red book

Panel 3
-Continuing support all area of P3.

3. NASDA standards for CCSDS

-NASDA suspended to make CCSDS based NASDA standards in Japanese.
-Each spacecraft project applies ISO documents (or CCSDS recommendations) as they are.

4. Organization and Manpower
NASDA CCSDS members as follows.

Delegate Tsukasa Mito
TSG/MC/ISO Hideo Hara

Panel1	T. Kikuchi (P1a)
	K. Takao (P1e)
	Y. Nonaka (P1f)
	M. Sawabe (P1j)
Panel2	Y. Inoue
Panel3	M. Fuda
	K. Shinohara

Total manpower has kept 2 persons / year.

NASDA STATUS REPORT

CCSDS MC (Newport Beach May 17-18th, 1999)

NASDA
NATIONAL SPACE DEVELOPMENT AGENCY OF JAPAN

Lessons –learned feed back on CCSDS AOS Recs used on the ETS-VII mission.

1. Features of telemetry and command requirements of ETS-VII
   a. Iso-chronous command requirement for Tele-robotics operation
   b. Widely variable telemetry transmission rate requirement
      Bulk data transmission on rare occasions (cf., software up-load and verification)
      It was considered to be difficult to ensure flexibility of operations and resolve complexity of data interface coordination using conventional multiplexing method.

2. Method adopted by ETS-VII

(1) Conventional NASDA telemetry and tele-command (TTC) standards are used for house-keeping data. CCSDS encapsulation service is used to exchange conventional TTC data between satellite control facility and onboard data processing unit called CU/RIU.

(2) ETS-VII adopts CCSDS standards for experiment data transmission. CCSDS path service is used to ensure synchronous data transmission and satisfy widely changing data transmission rate requirement. Data system is developed according to CCSDS recommendations. Its performance comes up to our expectations.

So far, no additional requirement is identified through ETS-VII design and operation.

ATTACHMENT L

PANEL 1A REPORT

P1A REPORT

M. L. MacMedan

TURBO CODE

- **Dispositioned 12 RIDs against Turbo Codes**
- **Agreed to minor changes**
- **Approved pink sheets to go Blue**
- **Resolution for P1**

OTHER CODES

- **Many proposed for bandwidth constrained (near-earth) environments**
- **Set up study group to review requirements, state of the art, and industrial standards (DVB-S) before adding more codes.**

LOSSY COMPRESSION

- **Goal was to pick one from among 3 agency candidates**
- **Performance submitted was so close no one appeared dramatically better**
- **JPEG2000, if it meets requirements, would be better political choice.**
- **Cannot get specs unless member; NASA has no funds for membership.**

  Resolution asking CCSDS to become liaison member.

RESTRUCTURING

- **6 restructured white books written in last 6 months and distributed to subpanel for comment. Diligent review requested at this meeting.**

- **64 slides of issues discussed at this meeting. Some were even resolved!**

- **Protocol Overview Green Book concept (very small) agreed to as a future task to help users select among the various protocols.**

PACKET TELEMETRY

- **Preparing pink sheets to add NP, IPv4, IPv6 and 16384-bit frame to fit longest turbo codeblock.**

TELECOMMAND (Part 1)

- **Preparing pink sheets to drop unneeded codeblock sizes.**

TELECOMMAND (PART 2.1)

- **Minor changes (as the result of experience working with the protocol) being considered for inclusion in Yamada's restructured books.**

PROXIMITY LINKS

- **Approved in P1A/E/F Joint Meeting; Red Book resolution proposed.**

The JPEG2000 issue

- **While developing CCSDS compression standards, JPEG2000 was investigated but did not appear to accommodate space needs such as line-mode compression (pushbroom type instruments). P1A tried to work with JPEG to accept this requirement.**

- **Reason: If JPEG2000 handles space compression requirements well, it should be adopted by CCSDS in lieu of developing special approaches, since commercial standards will become more widespread, familiar and cheaper.**

- **P1A submitted the requirement through WG chair, but has no access to working documents and cannot determine if its request was properly satisfied.**

- **Document access requires membership or liaison status.**
    - **Members**
        - **Must be national bodies, not international**
        - **Can vote**
        - **Must attend two out of four meetings a year to retain status.**
            - **Meetings are held around the world.**
        - **Get access to all documentation.**
    - **Liaison Status**
        - **Have no vote**
        - **Do not have to attend any meetings**
        - **May be peer standards bodies**
        - **Get access to all documentation**

- **NASA/GSFC is unable to allocate the travel funds to meet the obligations for membership status.**

- **P1A requests that CCSDS join JPEG under liaison status, which would permit JPEG documentation to be distributed freely among the CCSDS agencies, and encourages other space agencies to join as members if possible so as to influence its work through voting. The only space agency that is a JPEG2000 member currently is CNES.**

Resolution:

3. P1 resolves to request the CCSDS Management Council to seek liaison status with the JPEG2000 standardization effort (ISO/IEC JTC1/SC29/WG1, chaired by Dr Daniel Lee of Hewlett-Packard) to allow CCSDS members access to the JPEG working papers. As a further goal, the CCSDS MC is requested to seek a method for gaining voting status in this organization through one or more national bodies who are eligible for such status, such as NASA.

ATTACHMENT M

PANEL 2 REPORT

CCSDS Panel 2 Report to TSG/MC

David Giaretta

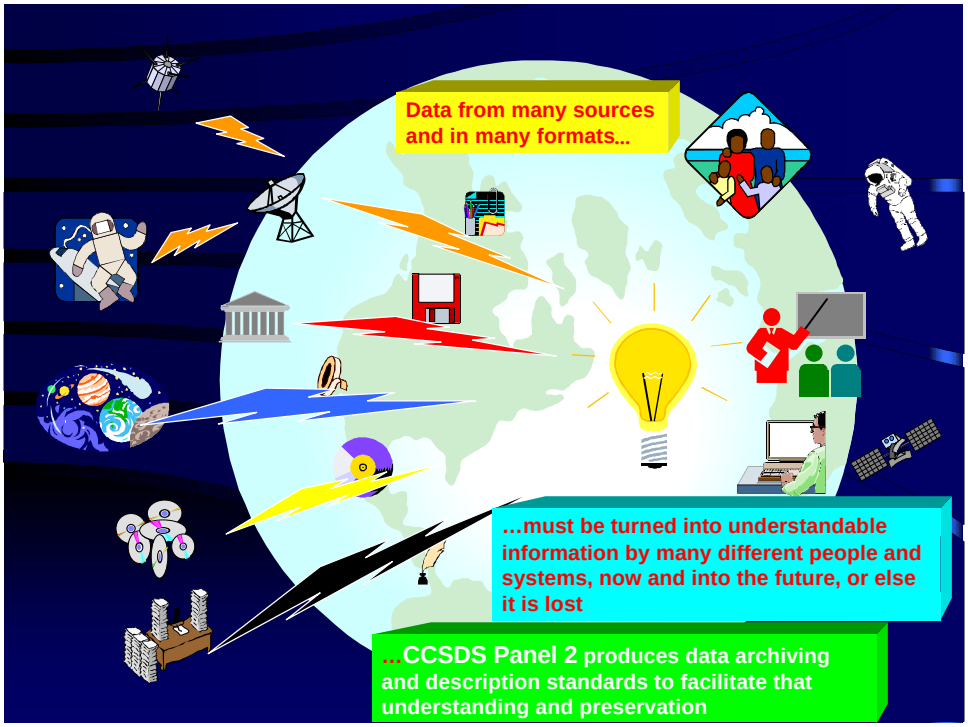
May 1999

ISO Registration of CCSDS Objects

- Naming and Addressing Working Group (NAWG) report

Strategic Plan - Theme 2
Panel 2

- Subtask 1: Data Management Services
- Subtask 2: Information Infrastructure Architecture for Space Data
- Subtask 3: Space Data Archiving Techniques



Theme 2 - Subtask 1: Data Management Services

Enable the development of standard tools for projects to manage the information they gather

- Define Services for short and medium term data repositories
  - OAIS Reference Model services
    - Access & Dissemination interfaces
    - Ingest interfaces
    - Long-term preservation
      - information needed for long term preservation must be captured at short/medium term repositories

...Subtask 1: Data Management Services

- Define Experiment data record services
  - Access services
    - data descriptions
    - JAVA class
    - XML

Subtask 2: Information Infrastructure Architecture for Space Data

Enable data to be usable by the widest community of users

- Develop data description techniques
  - EAST
  - PVL
  - *XML*
  - *JAVA*

..Subtask 2: Information Infrastructure Architecture for Space Data

- Develop interoperable data dictionaries
  - DEDSL
    - Abstract specification
    - PVL encoding
    - *XML encoding*
  - *Encourages development discipline dictionaries*

....Subtask 2: Information Infrastructure Architecture for Space Data

- Registration procedures
  - Control Authority
    - Procedures
    - Software
  - Distributed Systems for Automated data description retrieval
    - Control Authority Agent
    - Distributed system of Control Authorities
    - "Universal Resource Identifier" services for data descriptions
  - ISO registration

.....Subtask 2: Information Infrastructure Architecture for Space Data

- Define interchange structures and protocols
  - SFDU - various versions
  - ADID generalised usage
  - Developing next generation packaging and description, adapting new WWW-based technologies

Subtask 3: Space Data Archiving Techniques

The information gather by all missions must be available for future generations; archiving standards will increase the value of that information

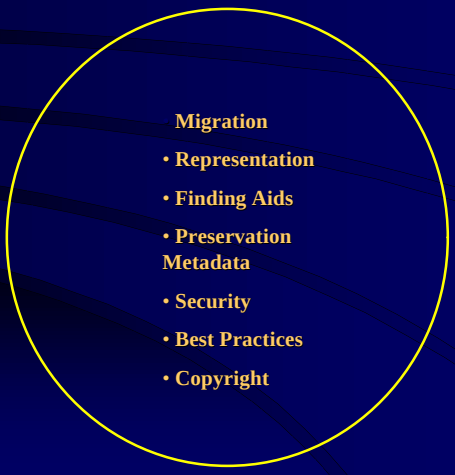
..Subtask 3: Space Data Archiving Techniques

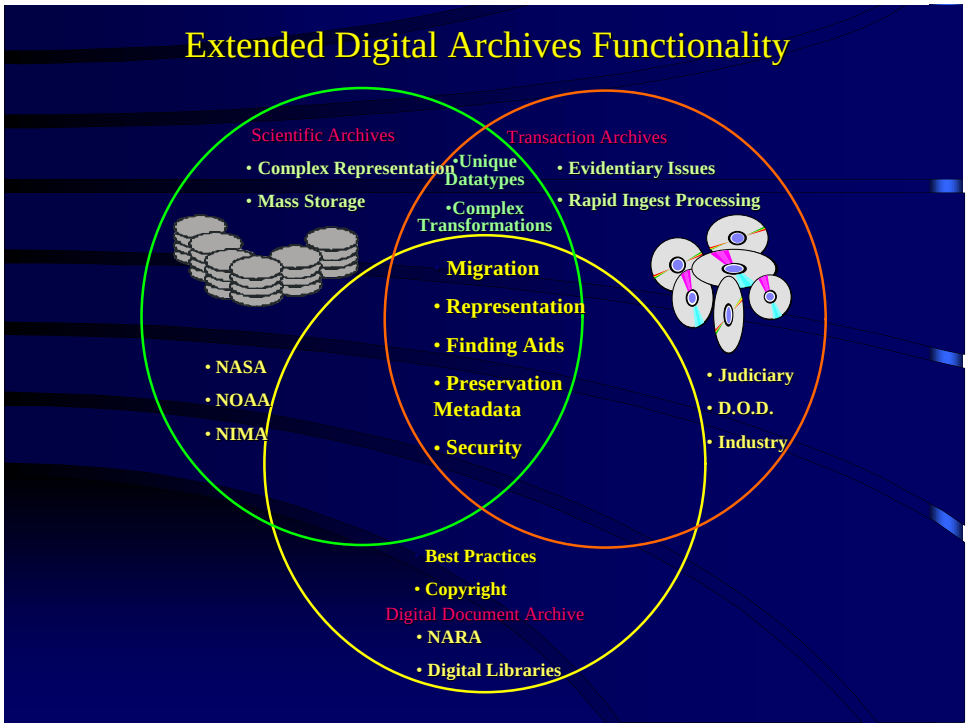
- Develop reference model for long term preservation archival systems
  - Open Archival Information Systems (OAIS) Reference Model
    - Wide acceptance in non-space related areas
    - ISO certification of archives will be important

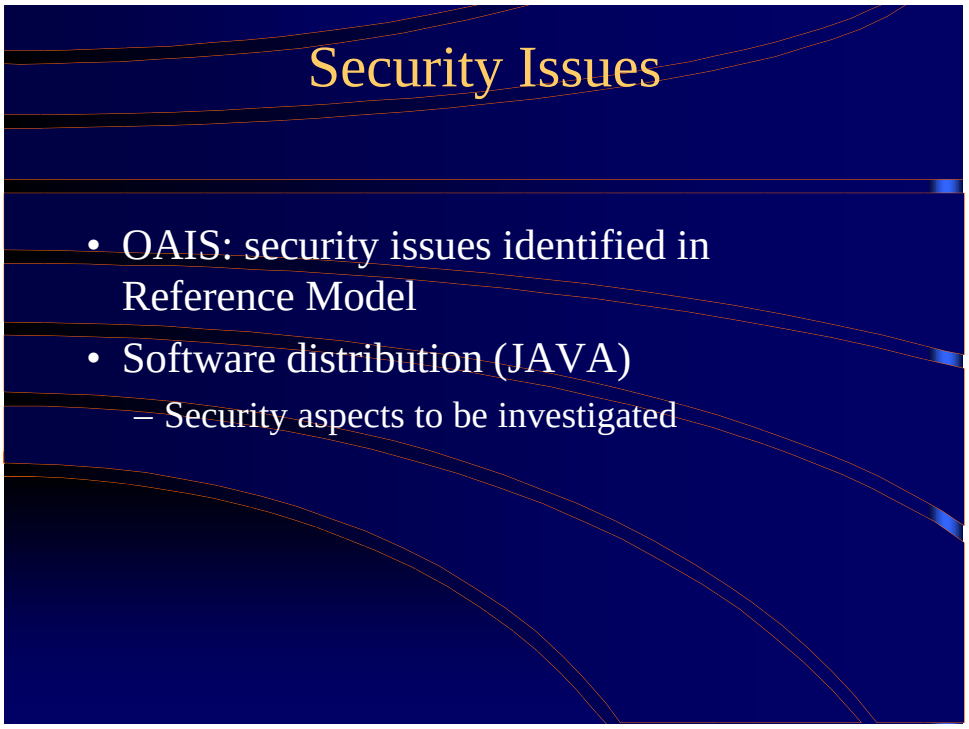
....Subtask 3: Space Data Archiving Techniques

- Develop standards for long term preservation of information
  - Standards arising from OAIS
    - Ingest:
      - standard ingest forms
      - standard ingest methodology
    - Data Identification for Archival Information Packages
    - Access & Dissemination

Digital Document Archives




Extended Digital Archives Functionality
Scientific Archives
• Complex Representation
• Mass Storage
• NASA
• NOAA
• NIMA
Transaction Archives
•Unique Datatypes
•Complex Transformations
• Evidentiary Issues
• Rapid Ingest Processing
• Judiciary
• D.O.D.
• Industry
Migration
• Representation
• Finding Aids
• Preservation Metadata
• Security
Best Practices
• Copyright
Digital Document Archive
• NARA
• Digital Libraries

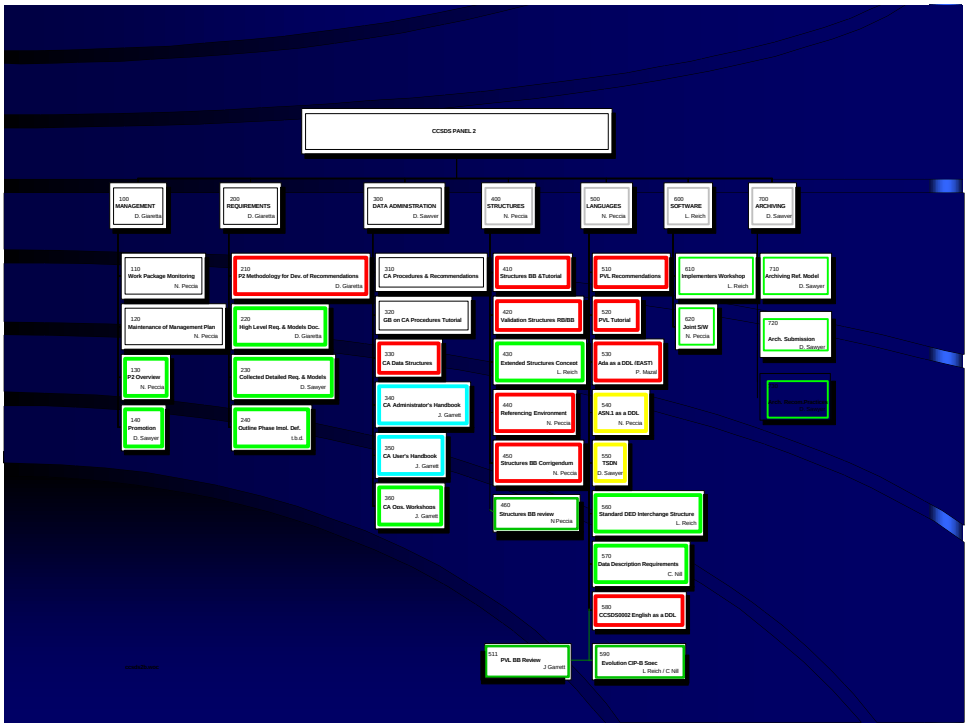

Security Issues
• OAIS: security issues identified in Reference Model
• Software distribution (JAVA)
– Security aspects to be investigated

Strategic Plan: Panel 2 changes

- Theme 1, task 7 should include P2 - particularly for security for data access and distribution (add bullet to bring this out explicitly)
- Make all Theme 2 tasks Short/Medium term because there are sub-tasks within each which are interdependent
- Theme 2, task 1, bullet 3 should be in italics
- Theme 4, task 3, bullet 3 (MPEG etc) should include P2 because
- Theme 5, task

Mars Proximity Links - Implications for P2

- Panel 2 is working with Ed Greenberg (P1) to develop appropriate data structures
  - proposal being drafted
- Open systems interchanges on Mars may require use of data description and registration techniques as developed by P2



WP100 - Management

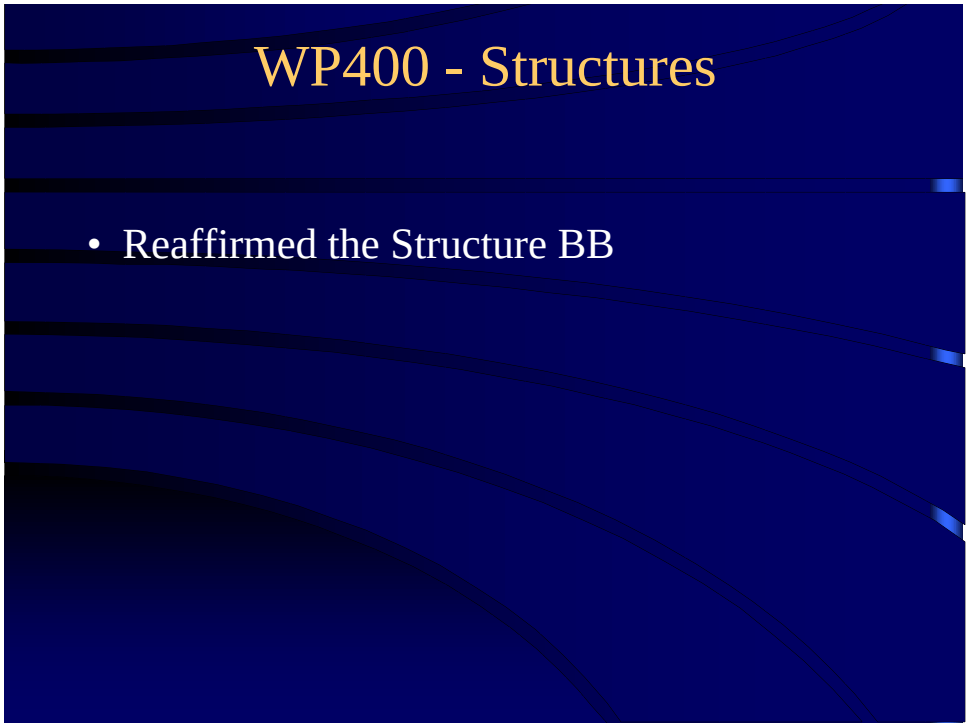
- Proposal to MC:
  - Endorse procedures developed by Panel 2 to allow an outside agency to act as a maintenance agency for mode 2 and mode 3 documents. This may involve that agency posting updates between official new versions of the documents. Official releases of such a document however would require CCSDS approval.

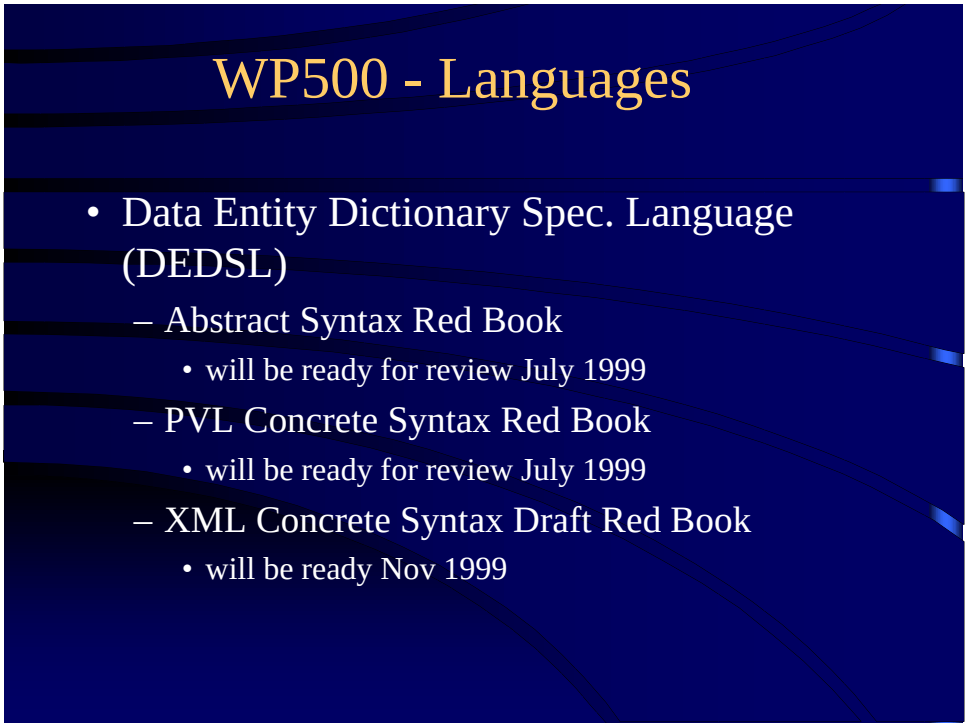
WP200 - Requirements

- New areas of work being explored
  - Importance of WWW technologies recognised
- Concept papers commissioned on various topics
  - Archive certification
  - Archive Ingestion Methodologies
  - Archive cataloguing/browsing
  - JAVA and Scientific API's
  - Viewer (emulator) technology

WP300 - Control Authority

- Progress in clarifying how the Control Authority fits into the broader ISO registration process
  - Naming and Addressing WG
- Software being developed to provide "URI" services


WP400 - Structures
• Reaffirmed the Structure BB


WP500 - Languages
• Data Entity Dictionary Spec. Language (DEDSL)
– Abstract Syntax Red Book
• will be ready for review July 1999
– PVL Concrete Syntax Red Book
• will be ready for review July 1999
– XML Concrete Syntax Draft Red Book
• will be ready Nov 1999

WP500 - Languages (cont)

- Parameter Value Language (PVL) Pink Book ready
  - includes support for expanded character set
- Reaffirmed ASCII English BB

WP500 - Languages (cont)

- Catalogue Interoperability Protocol (CIP-B) developed under CEOS.
  - Reorganisation and insertion of new material for CIP document completed
  - P2 reviewing this draft to check if it fulfills P2 requirements for multidisciplinary coverage
  - May be used by CEOS as basis for further developments of CIP
    - may return to P2 later
    - or be submitted to other ISO committee

WP600 - Software

- Solutions for MIGRATION Problems
  - EAST software being widely used
    - commercial exploitation in progress
  - NASA Information Set Product Creator (ISPC) being used to migrate data between VAX and UNIX
- Use of WWW technologies
  - Developing standard objects in JAVA
  - Control Authorities on the Internet
  - DEDSL
  - XML

Use of EAST in projects at CNES

SIPAD : includes **ARCAD**, **VICKING**, **PHOBOS**, **INTERBALL**...

SSALTO : Altimetry data (**TOPEX**, **JASON**…)
and Spacecraft location (**DORIS**)

Data description
Data extraction(new tool based on interpreter)
Data writing (new tool based on generator)

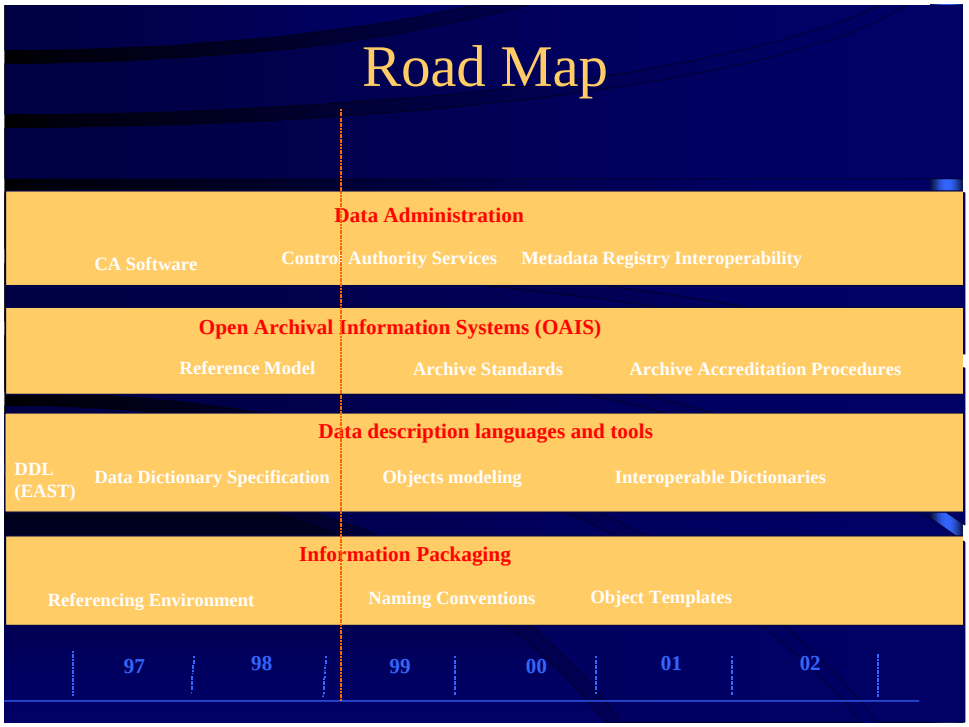
EARTH_OBSERVATION :
Description of **SPOT** images metadata
Preliminary studies on **SR_6_10** interfaces standard

MICRO SATELLITES : Definition of telemetry and products
(**ETHER**, **DEMETER**, **PICARD**, **COROT**….)

WP700 - Archiving

- Open Archival Information Systems (OAIS) Reference Model ready for publication
  - Red Book review
  - simultaneous submission as ISO DIS -
    - Wide community support
    - Terminology already being used by projects

Road Map



Liaison

- CEOS
  - CIP
- TC211
  - CIP
- NCITS/L8 (ANSI)
  - ISO 11179/ X3.285
    - (data element registration standards)
- IRTF

The following Resolutions are proposed by Panel 2

The Management Council resolves to reaffirm the following Blue Books

- SFDU Structures and Construction Blue Book
- Control Authority Procedures Blue Book
- ASCII Encoded English Blue Book

…proposed resolutions continued

The Management Council resolves to approve and distribute

- OAIS Red Book AND ISO DIS simultaneously
  - (CCSDS editor will get this by 15 July 1999)
  - RB Review period requested to be:
    - 15 August to 15 October 1999
      - so we have comments to review in Fall 99 meeting
  - ISO DIS review of 6 months, starting 15 August
      - to have adequate time to respond to RIDS by Spring 2000 meeting

The Management Council resolves to approve and distribute..

- DEDSL - Abstract Syntax Red Book
- DEDSL - PVL concrete syntax Red Book

FOR BOTH THESE BOOKS

- (CCSDS editor will get the book by end July 1999)
- RB Review period requested to be:
  - 1 Sept to 30 October 1999
    - so we have comments to review in Fall 99 meeting

The Management Council resolves to approve and distribute:

- PVL Pink Book
  - (CCSDS editor will get the mid-June)
  - RB Review period requested to be :
    - same as DEDSL reviews
    - 1 Sept to 30 October 1999
      - so we have comments to review in Fall 99 meeting

Proposed resolution for management Council

- Endorse procedures developed by Panel 2 to allow an outside agency to act as a maintenance agency for mode 2 and mode 3 documents. This may involve that agency posting updates between official new versions of the documents. Official releases of such a document however would require CCSDS approval.
  - Draft is available


Resolutions proposed for ISO TC20/SC13 by Panel 2
ISO TC20/SC13 resolves to submit
• OAIS for ISO DIS
– (CCSDS editor will get this by 15 July 1999)
– ISO DIS review of 6 months, starting 15 August
– to have adequate time to respond to RIDS by Spring 2000 meeting

ATTACHMENT N

PANEL 3 REPORT

Panel 3 Presentation

PROGRESS REPORT TO

Technical Steering Group
and
Management Council

Maurice Winterholer
P3 CHAIRMAN

Report to TSG & MC Newport Beach,US CAL 13,18 May 99

PANEL 3 Presentation outline

- Work plan

- **general status**
- **Document Tree**
- **Work Breakdown Structure/Active tasks**
- **Organization**
- **Milestones**

- Work Progress

- **Documentation production**
- **P3 Workshop #22 Activities**
- **Meetings**

- Conclusions

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 — **Work Plan**

General status

The Work plan was revised and updated at the P3 Workshop 22, in Newport ,USA CAL May 7-12, 99 .

1. WORK PRIORITIES MAINTAINED on the production of :
- **SLE Service management recommendations**
- **SLE Transfer Services recommendations**

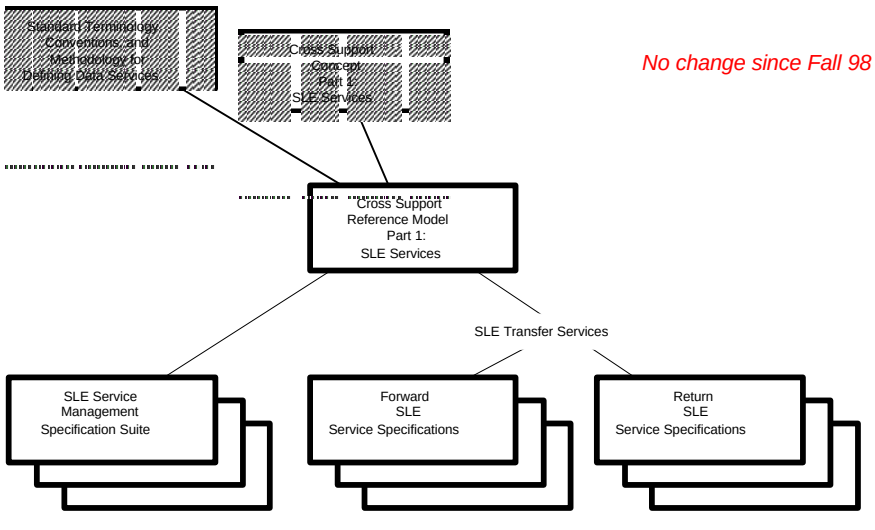
2. ORGANISATION MAINTAINED :
- **Working Groups WG1, WG2/3, WG4, WG5**

3. DOCUMENT PRODUCTION with small changes :
- **Scope of Service Management document enlarged with a 6 month schedule shift**
- **Transfer Service production**

. Slightly shifted by 1 or 2 month for basic return and forward services (RAF, RCF, CLTU, FTCF, FSP)
. Limited Services versions (CLTU, RAF) incorporated
. No progress foreseen in 99 for others (OCF, RSP, FSH) due to a lack of resources

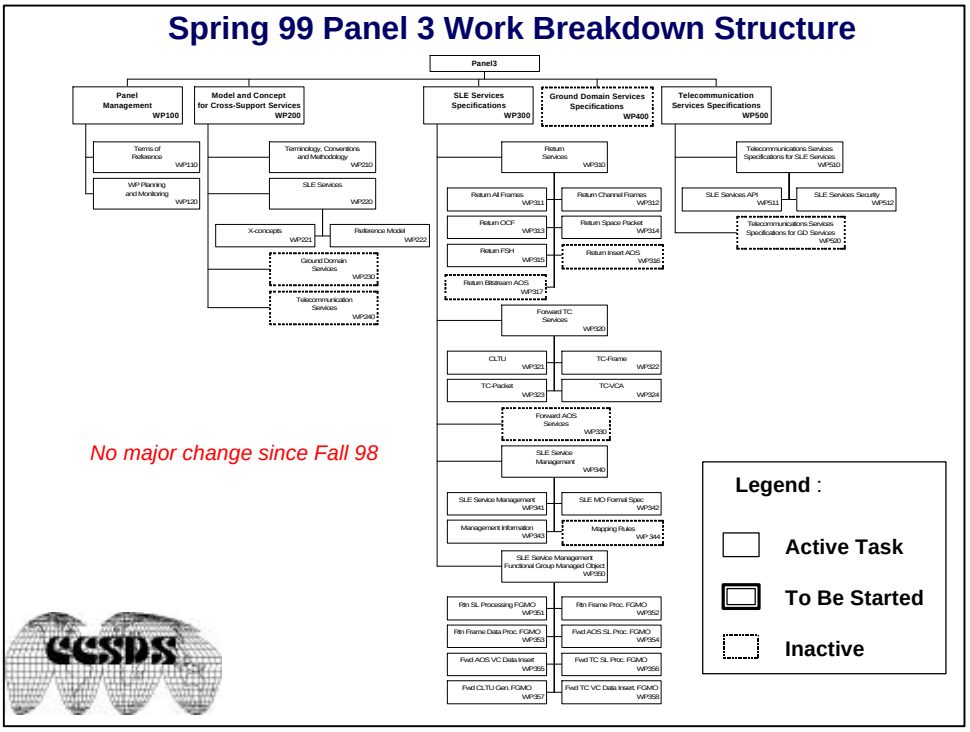
Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 — **Spring 99 SLE Documentation Tree**



No change since Fall 98

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*


Spring 99 Panel 3 Work Breakdown Structure
Panel3
Panel Management WP100
Model and Concept for Cross-Support Services WP200
SLE Services Specifications WP300
Ground Domain Services Specifications WP400
Telecommunication Services Specifications WP500
Terms of Reference WP110
WP Planning and Monitoring WP120
Terminology, Conventions and Methodology WP210
SLE Services WP220
X-concepts WP221
Reference Model WP222
Ground Domain Services WP230
Telecommunication Services WP240
Return Services WP310
Return All Frames WP311
Return Channel Frames WP312
Return OCF WP313
Return Space Packet WP314
Return FSH WP315
Return Insert AOS WP316
Return Bitstream AOS WP317
Forward TC Services WP320
CLTU WP321
TC-Frame WP322
TC-Packet WP323
TC-VCA WP324
Forward AOS Services WP330
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SLE Service Management WP341
SLE MO Formal Spec WP342
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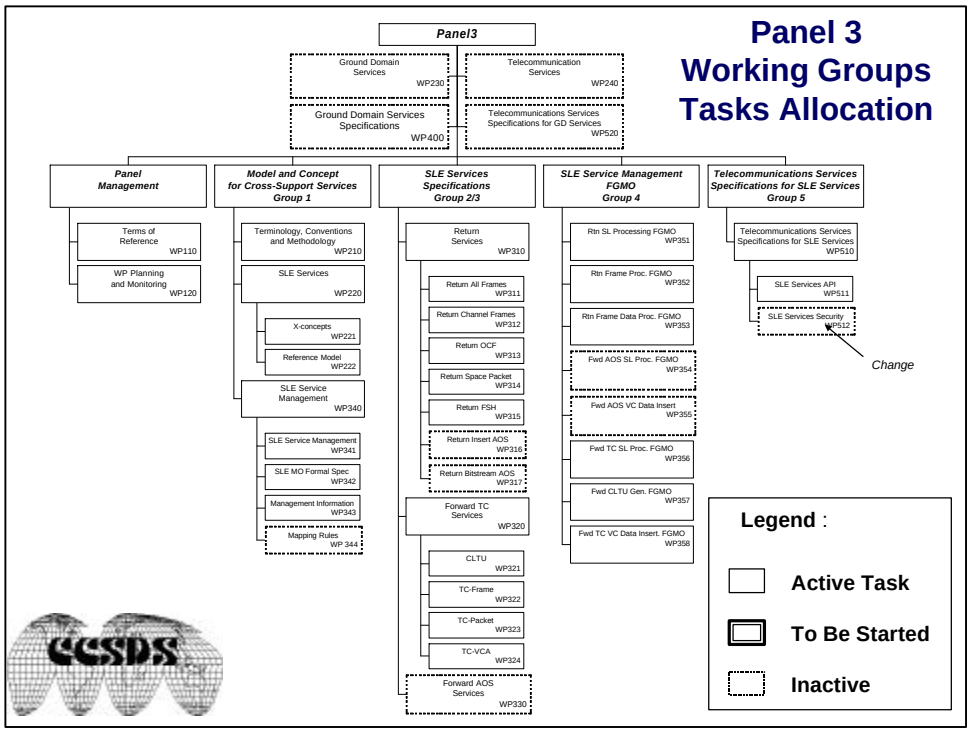
SLE Service Management Functional Group Managed Object WP350
Rtn SL Processing FGMO WP351
Rtn Frame Proc. FGMO WP352
Rtn Frame Data Proc. FGMO WP353
Fwd AOS SL Proc. FGMO WP354
Fwd AOS VC Data Insert WP355
Fwd TC SL Proc. FGMO WP356
Fwd CLTU Gen. FGMO WP357
Fwd TC VC Data Insert. FGMO WP358
Telecommunications Services Specifications for SLE Services WP510
SLE Services API WP511
SLE Services Security WP512
Telecommunications Services Specifications for GD Services WP520
No major change since Fall 98
Legend :
Active Task
To Be Started
Inactive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Rtn Frame Proc. FGMO WP352
Rtn Frame Data Proc. FGMO WP353
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Fwd AOS VC Data Insert WP355
Fwd TC SL Proc. FGMO WP356
Fwd CLTU Gen. FGMO WP357
Fwd TC VC Data Insert. FGMO WP358
Telecommunications Services Specifications for SLE Services WP510
SLE Services API WP511
SLE Services Security WP512
Change
Legend :
Active Task
To Be Started
Inactive

PANEL 3 Spring 99 Work Package Status

WP ID	PACKAGE TITLE	STATUS
WP 110	Terms of reference	*closed / YB*
WP 120	WP Planning and monitoring	active
WP 210	TCM	*closed / GB*
WP 221	Cross Support Concept	*active / GB*
WP 222	SLE-Reference Model	*active / BB*
WP 311	RAF Service Specification	active
WP 312	Return Frames (VC& MC)	active
WP 313	Return OCF (MC & VC)	active
WP 314	Return Space Packet	active
WP 315	Return FSH (MC& VC)	active
WP 321	CLTU Service Specification	active
WP 322	Forward TC Frame Specification	active
WP 323	Forward Space Packet	active
WP 324	Forward TC-VCA	active

active : WP under process
closed : WP achieved GB/BB/YB
waiting : WP not started

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 Spring 99 Work Package Status

WP ID	PACKAGE TITLE	STATUS
WP 341	SLE-Service Management Specs	active
WP 342	SLE-Services MO formal Specs	active
WP 343	SLE- services Management Information	active
WP 344	Mapping rules	inactive
WP 351	FGMO specification (RAF aspects)(1)	active
WP 356	FGMO specification (CLTU aspects) (1)	active
WP 511	SLE application programming interface(2)	active
WP 512	SLE security framework (2)	inactive

(1) this work in WG4 covers all RF and modulation production issues,
(2) this work is done in WG5

____ *(underline identifies changes from WS21)*

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 — Spring 99 Panel 3 Organization

The Working Group structure was updated in Houston, May 1998

No significant change

WG 1 : responsible for WP 210 (TCM), WP 220 (SLE Services Models and Concepts) and WP340 (SLE Management). This group maintains the :

1. **TCM** - *existing Green Book No change needed*
2. **Cross support Concept** - *existing Green Book revision needed*
3. **SLE Reference Model documents** - *existing Blue Book revision needed*
4. **SLE Service Management Specification** - *existing ; RED in Fall 1999*
5. **SLE Managed Object Formal Specifications** - *existing draft*
6. **SLE Service Management Information File Specifications**
7. **SLE Services mapping rules-** inactive

Lead of WG1 : Fred BROSI (NASA/GSFC)

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PANEL 3 — Spring 99 Panel 3 Organization

WG2 : responsible for the WP310 (SLE Return Services Specifications). This group develops the detailed specifications for the SLE Return Services, according to SLE Reference Model and Service Management Specification documents, with the following priorities :

1. **Return All Frames (RAF) -** *existing RB (July 98),* ***new RB-2 mid 99***
2. **Return Virtual Channel Frame (RVCF) -** *existing RB (July 98)****, new RB-2 in mid 99***
3. **Return Master Channel OCF (RMC-OCF) -** *existing WB (July 98)*
4. **Return Master Channel FSH (RMC RVC -FSH) -** *existing WB (July 98)*
5. **Return Virtual Channel OCF (RVC-OCF) -** *existing WB (July 98)*
7. **Return Space Packet (RSP) -***existing WB (July 98)*

Lead of WG2 : Martin Pilgram (DLR)

WG3 : responsible for the WP320 (Forward Tele command Services Specifications). This group develops detailed specifications for the SLE Forward Tele command Services according to SLE Reference Model and Service Management documents, with the following priorities :

1. **CLTU** - *Red version reviewed by Agencies April 98,* ***new Red 2 mid 99***
2. **Tele command frame -** *existing WB (April 98);* ***new Red 2 mid 99***
3. **Forward Space Packet - new** ***RB2 (June 99)***
4. **Tele command VCA -** *existing WB (July 98)*

Lead of WG3 : Martin Pilgram DLR)

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PANEL 3 Spring 99 Panel 3 Organization

WG 4 : responsible for WP 350, this group will :

. Identify and analyse the (operational) management requirements for service provision and production (actions, notifications)
.Attempt to map the parameters and management requirements to derived FGMOs (first English specification) and/or other MOs.
.Generate the formal FGMO specification in GDMO

Lead of WG4 : Wolfgang Hell (ESA/ESOC)

WG 5 : responsible for WP 510 (Telecommunication services for SLE services especially for WP 511 (SLE API) and WP 512 (SLE Services security)).
This group will :

- **Specify a recommended application programming interface (API) for applications to interface to the SLE service element**
- **Select appropriate safeguarding techniques for user authentication and data object protection to support implementation of the SLE services**
- **Select a suite of available standard communication and related services and protocols to support implementation of the SLE services**

It initially addresses SLE-API and SLE security framework. Later it will expand to include additional other communications aspects (e.g., transport, "middleware," directory services)

Lead of WG5 : Michael Stoloff (NASA/JPL)

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PANEL 3 Spring 99 Documents production schedule

	1997	1998		1999		2000	
TCM							
CS Concept							
CS Ref Mod							
SLE Service Mgmt	White			~~*Red*~~	**Red**	Blue	
SM MO GDMO				*White*	Red	Blue	
~~**SM FGMO**~~			~~Draft~~	~~*White*~~			
~~**SM FGMO GDMO**~~					~~White~~		
SM Mgmt Info (*)				~~*White*~~		~~Red~~	
SLE RAF		Red		Red-2		Blue	
SLE RCF		Red		Red-2		Blue	
SLE FSP		Red		Red-2		Blue	
SLE TCF			White	Red		Blue	
SLE CLTU		Red		Red-2		Blue	
SLE ROCF			White	~~*Red*~~		Blue??	
SLE RFSH			White				
SLE RSP			White				
SLE TCVCA			White			Blue ??	
SLE Appl API				*Draft*	White		
SLE Security				~~Draft~~		**Draft**	

(*) now included in SM document

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 WORK PROGRESS

- **Documentation production before WS 22**
- **P3 Workshop #22 Activities**
- **Meetings**

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 WORK PROGRESS since HOUSTON

Last issues of Documents release in May 99 before WS 22

WP 223 : SLE Service Management (*)	***: 910.5-W-1.19***	***April 99***
WP 311 : Return AF Service	**: 911.1-R-1**	**July 98**
WP 312 : Return VC Frame	***: 911.2-R-1***	***July 98***
WP 313 : Return MC/VC-OCF Service	**: 911.3-W-2**	**July 98**
WP 315 : Return Space Packet	**: 911.7-W-1**	**August 98**
WP 316 : MC FSH & VC FSH	**: 911.5-W-1**	**July 98**
WP 321 : Forward CLTU Service	**: 912.1-R-1**	**March 98**
WP 321 : Forward CLTU Service UPDATED	**: 912.1-XXX**	**April 98**
WP 322 : Forward TC Frame Service(*)	***: 912.2-d/R-1***	***April 99***
WP 323 : Forward Space Packet Service (*)	***: 912.3-d/R-1***	***April 99***
WP 324 : Other Forward Services : TC-VCA	***: 912.4-W-2***	***july 1998***

(*) new document issues and changes since Houston

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 **Panel 3 Workshop #22 Activities**

1. Technical presentation in P3 plenary on on specific topics related to SLE transfer services and Management

2. Service Management Specification document review
   - detailed technical review of last version
   - provision of inputs to WG1 for the first RED issue

3. Transfer Services specifications (White Books, draft Red) review
   - Technical issues disposition
     - SLE protocol refinement
     - SLE book merging proposal
     - limited version of CLTU & RAF services
   - Provision of inputs to WG2&3 technical editors for revised issues

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 **Panel 3 Workshop #22 Activities**

4. Current Work plan revision
   - Agreement on Work packages /No new activity started
   - Current activities schedule updated
   - Short term action items list assigned

5. CCSDS Strategic Plan (CSP)
   - presentation
   - comments

6. Future meetings discussion
   - maximum use of electronic exchange tools
   - human face to face meeting still needed!

   - Next P3 Workshop "23" : 11-15 October 1999 in FRASCATI (ESRIN)

   - Intermediate WG meetings in 1999
     - WG1 July in Paris and Sept in Greenbelt
     - WG2/3/4/5Tbd

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3

MEETINGS of Panel 3

Past meetings

Workshop 16 in May 1-7 , 96 in PASADENA
Workshop 17 in November,4-8 , 96 in OBERPFAFFENHOFEN
Workshop 18 in May 19-23, 97 in SILVER SPRING
Workshop 19 in November 3-7, 97 in VILLAFRANCA
Workshop 20 in May 4-8, 98 in HOUSTON
Workshop 21 in Oct 26-30, 98 in DARMSTADT
Workshop 22 in May 07-12, 99 in NEWPORT

Working groups meetings in 1999 before Newport WS22

1 intermediate meeting for WG1/2/3/4/5 in Jan GST/Greenbelt
1 intermediate meeting for WG1 in March ESOC/Darmstadt

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3

CONCLUSIONS :

- High technical consensus, and cooperative spirit

- progress toward Red book production

- Agencies are kindly requested to allocate adequate resources including travel possibilities in order to keep the schedule

Thanks to NASA/JPL for excellent hosting

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 **WORK PROGRESS since HOUSTON**

SLE Transfer Services

SLE Transfer Services provide operations for:

- Data transfer
- User notification and reporting
- User control

SLE Return Services:

1. Return All Frames (RAF) - *existing RB (July 98)*
2. Return (Virtual) Channel Frame (RCF) - *existing RB (July 98)*
3. Return OCF (MC/VC-OCF) - *existing WB (July 98)*
4. Return FSH (MC/VC-FSH) - *existing WB (July 98)*
5. Return Space Packet (RSP) - *existing WB (July 98)*

SLE Forward Tele command Services:

1. Command Link transmission Unit (CLTU) - *RB ; to be reissued before June (((date TBD)*
2. Tele command frame (TC Frame) - *existing WB ; ready to be submitted to Red May /99*
3. Forward Space Packet (FSP) - *existing draft RB2 (April99)*
4. Tele command VCA (TCVCA) - *existing WB (July 98)*

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

PANEL 3 **WORK PROGRESS since HOUSTON**

SLE Service Management

The SLE service Management provides operations for the exchange of management information between the MDOS and the SLE System

SLE service management includes:

- Scheduling of services
- Set-up, configuration, and termination of service provision
- Management of service production
- Management reporting and accountability
- Fault management
- Security management

Documentation

1. TCM - ***existing Green Book No change needed***
2. Cross support Concept - ***existing Green Book revision needed***
3. SLE Reference Model documents - ***existing Blue Book revision needed***
4. SLE Service Management Specification - ***existing ; RED in 1999***
5. SLE Managed Object Formal Specifications - ***existing draft***
6. SLE Service Management Information File Specifications - ***need for Agency specific examples***
7. SLE Services mapping rules - ***inactive***

Report to TSG & MC Newport Beach,US CAL 13,18 May 99 *Winterholer*

ATTACHMENT O

CCSDS STRATEGIC PLAN

STRATEGIC PLAN OF THE CONSULTATIVE COMMITTEE FOR SPACE DATA SYSTEMS

May 1999

Draft 3.2

CCSDS CHARTER[2]

PREAMBLE

The major space agencies of the world recognize that there are benefits in using standard techniques for handling space data and that, by cooperatively developing these techniques, future data system interoperability will be enhanced. In order to assure that work towards standardization of space-related information technologies provides the maximum benefit for the interested agencies, both individually and collectively, an international Consultative Committee for Space Data Systems (CCSDS) is established as a forum for international cooperation in the development of data handling techniques supporting space research, including space science and applications, for exclusively peaceful purposes.

PURPOSES

The purposes of the CCSDS are as follows:

1) to provide a forum whereby interested agencies may exchange technical information relative to the development or application of standards for space-related information technologies;

2) to identify those common elements of space data systems which, if implemented in a standardized way, will result in significant enhancements in the operation of future cooperative space missions, or in the sharing of mission products;

3) to develop through consensus appropriate Recommendations that will guide the development of agency infrastructure so that interoperability is maximized;

4) to facilitate and promote the use of software and hardware developed under the CCSDS program by all participating agencies;

5) to promote the application of the Recommendations within the space mission community; and

6) to maintain cognizance of other international standardization activities that may have direct impact on the design or operation of space mission data systems.

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[2] The CCSDS Charter was originally approved in 1982. It has been updated in May 1999.

This strategic plan for the Consultative Committee for Space Data Systems (CCSDS) has been reviewed and approved by the undersigned CCSDS Member Agency Heads of Delegation

Peter A. Vaughan	***Date***
British National Space Centre	
Arvind Bastikar	***Date***
Canadian Space Agency	
Roland Ivarnez	***Date***
Centre National d'Etudes Spatiales	
Hubertus Wanke	***Date***
Deutsches Zentrum für Luft- und Raumfahrt e.V.	
Carlo Mazza	***Date***
European Space Agency	
Eduardo W. Bergamini	***Date***
Instituto Nacional de Pesquisas Espaciais	
David L. Townley	***Date***
National Aeronautics and Space Administration	
Koichi Ayabe	***Date***
National Space Development Agency of Japan	
Vladimir N. Starostin	***Date***
Russian Space Agency	

Contents

Introduction

The Consultative Committee for Space Data Systems (CCSDS) was formed in 1982 by letter of agreement, signed by responsible officials of the participating national and international space agencies. In 1990, Technical Committee 20 (TC 20) of the International Organization for Standardization (ISO) formed Subcommittee 13 (SC 13), Space Data and Information Transfer Systems. Recognizing CCSDS as a leading international authority in standards for space-related information technologies, ISO agreed that CCSDS has the primary responsibility for technical development of ISO TC 20/SC 13 standards.

Since its formation in 1982, the CCSDS has developed and published in excess of two dozen Recommendations for Space Data System Standards, the majority of which have become full international standards and are currently in widespread use across the international space community.

The purposes of the CCSDS are contained in the Charter (above). Essentially, they are to provide a forum in which the CCSDS Agencies can discuss common space data communications problems and arrive through consensus at standard solutions to those problems, thereby increasing interoperability among agencies and decreasing costs. This strategic plan defines the vision, mission, strategic goals, and domains for standardization for the CCSDS as a whole and for its technical panels. It also reaffirms the agreement entered into by the founding agencies of the CCSDS.

This Strategic Plan is supplemented by a separate Operating Plan that provides organizational details and contains the CCSDS Technical Panel Plans of Work based on the contents of this Strategic Plan. The Strategic Plan has been approved by the CCSDS Member Agency Heads of Delegations to the CCSDS. The Operating Plan has been established and will be maintained by the CCSDS Management Council.

Vision

The vision of the CCSDS is to increase the interoperability of space mission information systems by leading the international standardization activities that integrate these systems with the global information infrastructure.

The CCSDS will thus enhance the international exploration and utilization of space while simultaneously realizing significant savings in cost and development time for all participants and increasing the use and value of the information gathered.

Mission

The mission of CCSDS is to provide the means whereby space agencies can reach voluntary consensus on standardized solutions to common problems associated with the design of space mission information systems. The fruits of that consensus will be made available to the space community in the form of new international standards along with hardware and software that facilitate their adoption.

The CCSDS will therefore provide the environment and infrastructure whereby:

- The international space community—space agencies and their partners—will openly discuss common problems associated with implementing space mission information systems so as to identify where standard solutions will be beneficial.
- Technical experts within the community will adopt, adapt, or develop the necessary Recommendations. The resources needed for these activities will be provided primarily by the participating agencies at levels commensurate with their individual requirements. Where mutual interests exist, the CCSDS will develop alliances with other organizations as appropriate.
- The community will formally review and comment on those Recommendations as their development progresses.
- The CCSDS Agencies will approve the publication of Recommendations when their review is complete and consensus is achieved.
- The Recommendations will be available for adoption and use across the community.

In executing this mission, the CCSDS will:

- adopt or adapt current global information infrastructure standards where advantageous;
- develop new Recommendations for critical space-related information technologies where current standards are inadequate;
- allow the agencies (at their individual discretion) to open the standardization process, on a voluntary basis, to all interested parties across their government, private sector, and academic space communities;
- use experimentation and demonstration as integral components of developing Recommendations;
- encourage partnerships between space agencies and the commercial sector to produce off-the-shelf hardware and software so that the Recommendations can be used to build space mission information systems that are scaleable, fast to integrate, and low in cost.

Strategic Goals

The Strategic Goals of the CCSDS are:

- to maintain and propagate the existing set of CCSDS space mission information system interchange techniques that currently support the needs of virtually all spacecraft in the vicinity of Earth and deep space;
- to extend these existing capabilities to meet the new requirements of international missions to be flown in the first decade of the new millennium, including:
  - constellations of spacecraft in the vicinity of Earth,
  - constellations of spacecraft in deep space, and
  - orbiting and in-situ landed vehicles deployed around and on other Solar System bodies;
- to use these aggregate capabilities to stimulate the buildup of internationally interoperable space data communications and navigation infrastructure throughout the Solar System, to support a mix of both robotic and eventual human exploration;
- to play a leading role in the development of standardized communications and navigation capabilities to support international planetary exploration;
- to exploit the power of standardization to achieve significant reductions in mission costs and integration time, while supporting increased performance, safety, and reliability;
- to accomplish these advancements by encouraging the adoption of standardized, interoperable data and information transfer systems across the international space community and by encouraging the development of space as a commercial marketplace;
- to increase the value of the information gathered by space missions by making that data interpretable and accessible by the widest contemporaneous audience and by future generations;
- to define profiles from new and existing standards to be used to facilitate interoperability among agencies.

Domains for Standardization

The CCSDS will promote standardization across the three space mission information system service domains illustrated in figure 1 and described in the text that follows.

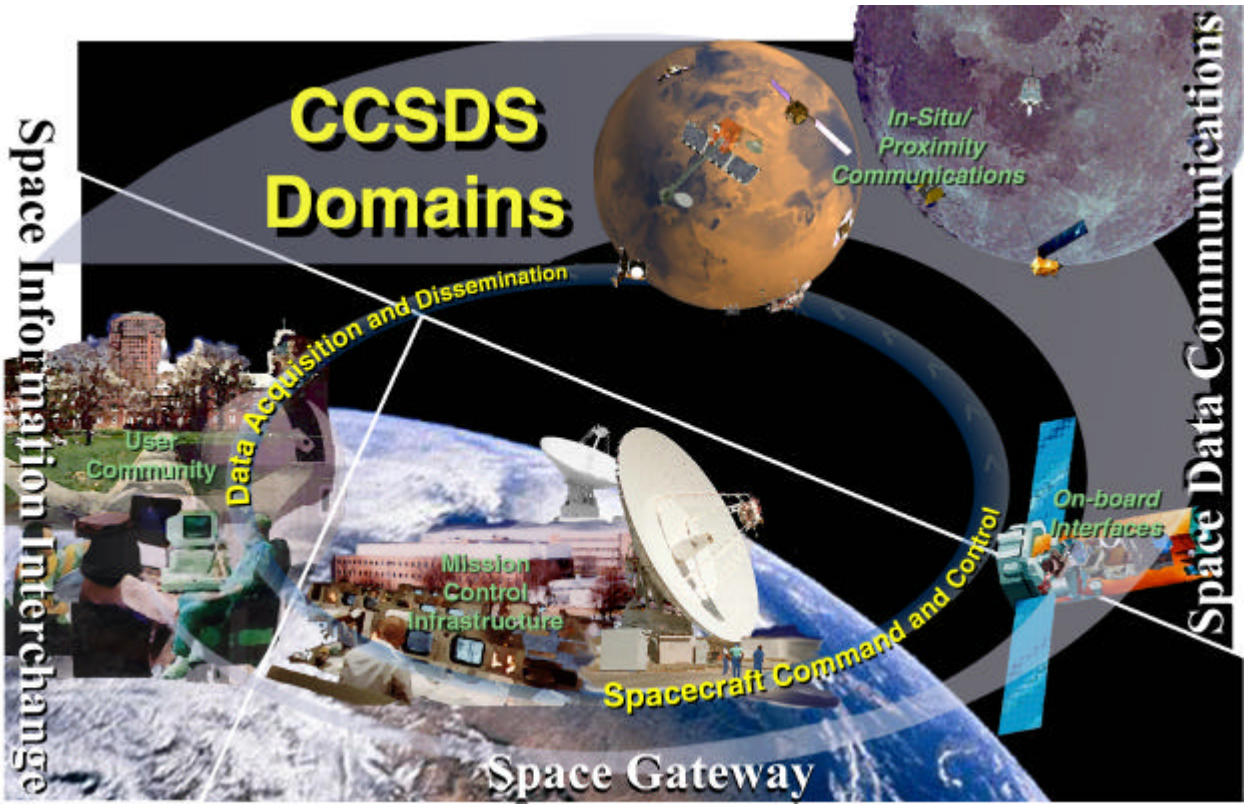


Figure 1: Space Mission Information System Service Domains

- ***Space Data Communications Services*** that allow user applications to exchange information through the data networks that interconnect the space and ground segments of the mission operations system—these services will allow in-space deployment of applications that are functionally equivalent to their counterparts in the global information infrastructure, and they will transparently confine "space uniqueness" to the space segment.

- ***Space Gateway Services*** that are needed to interface the space data communications services with the ground segment of the operations system—these services are required because, for reasons of protocol compactness and efficiency, the raw space communications services are often not designed to traverse the ground segment independently.

- ***Space Information Interchange Services*** that facilitate the preservation, access, and exchange of space mission-related information across the Global Information Infrastructure and the space mission information systems infrastructure—these services will increase the value of information gathered from space by enabling it to be transparently used by current and future users of the information infrastructure.

These three domains are united within the CCSDS by end-to-end concepts concerning command and control and data acquisition and dissemination.

1.1.1.1.1.1.1.1.

Definitions

Global Information Infrastructure (GII): a conceptual worldwide assembly of systems that integrates five essential components:

- communications networks, such as telephone, cellular, cable, and satellite networks;
- information equipment/appliances, including computers, televisions, and telephones;
- information resources, including educational materials, medical databases, and entertainment and commercial programs;
- applications, such as telemedicine, electronic commerce, and digital libraries; and
- people of all skill levels and backgrounds.

The GII will continually evolve as it incorporates more advanced technologies, new information, new consumers, and different ways to use its resources.

profile: a selection of standards or options that can be used together to provide a certain level of interoperability.

Recommendations for Space Data System Standards (Recommendations): technical specifications for space-related information technologies, developed by the CCSDS technical panels and recommended by the CCSDS as the basis for agency standardization. CCSDS Recommendations are often simply adopted as agency standards. They are routinely submitted to ISO for adoption as international standards.

spacecraft: in the context of this Plan, any spaceborne satellite, vehicle, or installation, including launch vehicles, orbiting observatories, science and technology vehicles, space stations and their supply vehicles, planetary rovers and landers, etc.

space mission information systems: information systems involved in the command and control of spacecraft and in the acquisition and dissemination of data from those spacecraft. These systems do not include systems that provide communications services to the users of commercial communications satellites.

space-related information technologies: technologies that enable space mission information systems.

ATTACHMENT P

CCSDS OPERATING PLAN MATRICES

CCSDS OPERATING PLAN FOR STANDARDS DEVELOPMENT

May 1999

Draft2.1

This operating plan has been reviewed and approved by the undersigned Member Agency Principal Delegates to the Consultative Committee for Space Data Systems.

Peter A. Vaughan ***British National Space Centre***	***Date***
Arvind Bastikar ***Canadian Space Agency***	***Date***
Roland Ivarnez ***Centre National d'Etudes Spatiales***	***Date***
Hubertus Wanke ***Deutsches Zentrum für Luft- und Raumfahrt e.V.***	***Date***
Carlo Mazza ***European Space Agency***	***Date***
Eduardo W. Bergamini ***Instituto Nacional de Pesquisas Espaciais***	***Date***
David L. Townley ***National Aeronautics and Space Administration***	***Date***
Koichi Ayabe ***National Space Development Agency of Japan***	***Date***
Vladimir N. Starostin ***Russian Space Agency***	***Date***

Organizational Considerations

CCSDS has been chartered by Technical Committee (TC) 20/Subcommittee (SC) 13 of the International Organization for Standardization (ISO) to develop all space-related ISO information technology standards. In partnership with its sister subcommittee, ISO TC 20/SC 14, CCSDS is responsible for the development of all space mission-related data and information transfer standards.

The international space mission standardization process and relationships are shown in figure 2.

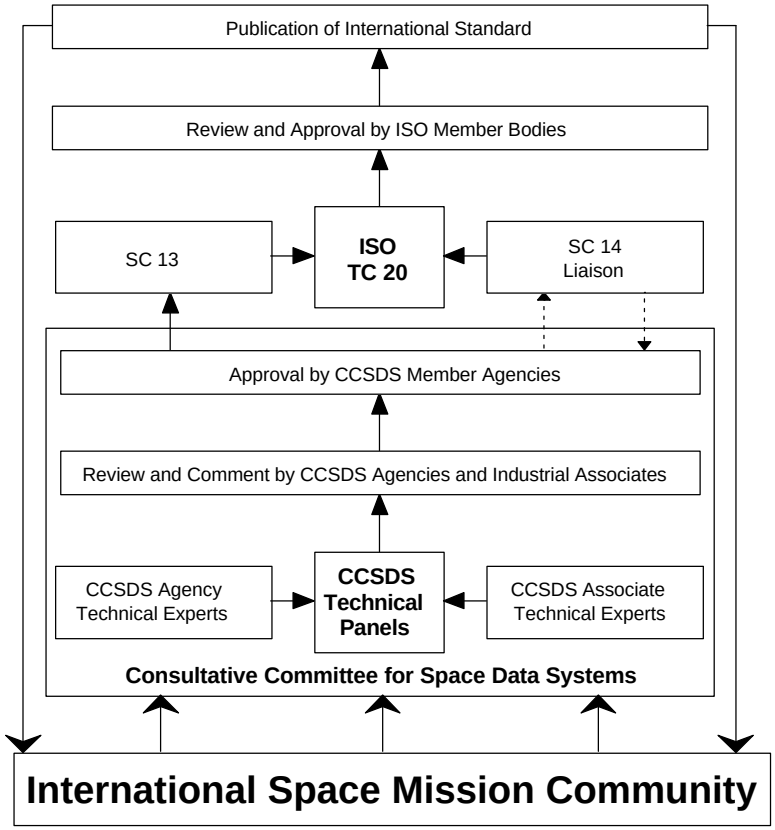


Figure 2: International Space Mission Standardization Process

The organization of the CCSDS is shown in figure 3. Panel 1 covers all activities concerning the Space Data Communication Services, Panel 2 those covering the Space Information Interchange Services, and Panel 3 those of the Space Gateway Services.

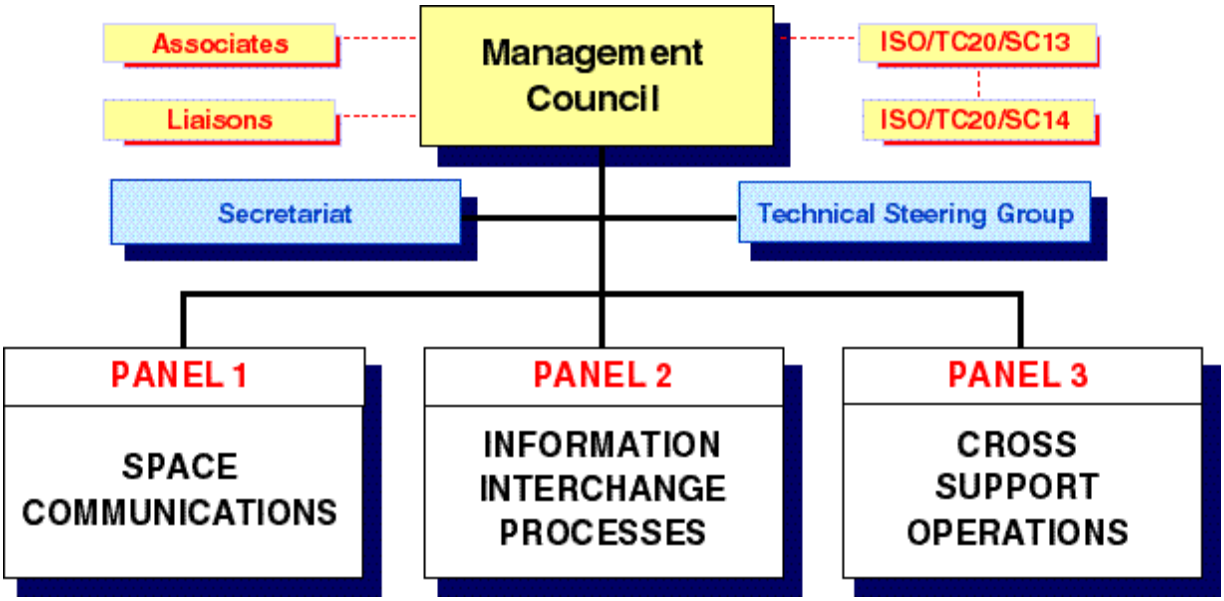


Figure 3: CCSDS Organization

Operating Mode

CCSDS-recommended standards have been widely accepted by the international space community because CCSDS has operated in a mode that directly responded to the needs of participating-agency flight projects and mission-support infrastructures. The existing CCSDS Recommendations were developed jointly by the experts of the member agencies, with contributions from the observer agencies and industry. In some cases, a subset of the CCSDS agencies may have taken the lead in proposing concepts and producing documents, but in all cases the developmental process remained within the CCSDS community.

Because the challenges of the CCSDS Strategic Goals and the commitments to ISO space-related subcommittees have grown in contrast to the shrinking resources of the CCSDS agencies, it will become necessary for the CCSDS to adopt new approaches to recommended standards development. In particular, the CCSDS recognizes the need to form strategic alliances with entities outside the CCSDS (see figure 4) and to allow when necessary one or a few individual agencies to undertake the bulk of development work on a given Recommendation.

Figure 4: Development Modes

The introduction of these new approaches necessitates expansion of the CCSDS mode of operation into three basic areas:

1) The CCSDS generates the requirements for, develops, reviews, and approves a recommended standard using for all these steps the resources of its agencies. CCSDS reviews the recommended standard and approves it as a CCSDS Recommendation.

2) The CCSDS generates the requirements for a recommended standard. The development of the recommended standard (or part of it) is carried out through alliances with partners. Partners could be other standards organizations or commercial entities. CCSDS and partners review the recommended standard and approve it as a CCSDS Recommendation.

3) The CCSDS generates the requirements for a recommended standard. An existing standard covers all or part of these requirements. The part covering CCSDS requirements is adopted as a CCSDS Recommendation, or part of a Recommendation, after appropriate review. Any remaining requirements will be processed in one of the above two modes.

The division of responsibilities within these three modes is summarized as follows:

Mode	Generation of Requirements	Development	Review	Approval
1	CCSDS	CCSDS	CCSDS	CCSDS
2	CCSDS	CCSDS in an alliance with other entities	CCSDS	CCSDS
3	CCSDS	Adopt existing standards	CCSDS	CCSDS

NOTE – In all cases the CCSDS Recommendation will be transferred, as in the past, to ISO for review and approval as an ISO standard.

Strategy for Standardization

CCSDS will develop recommendations for future space data and information transfer standards in accordance with six broad themes:

1) Efficient Communications in Resource-Constrained Environments
2) Standard Data Interchange and Archiving Services
3) Standard Space Mission Operations Services
4) Interfaces with Dedicated Commercial and Non-Commercial Systems
5) Space Missions as “Nodes on the Internet”
6) Interoperable “Plug-’n-Play” Spacecraft Components

Themes 1 through 3 are existing CCSDS themes. They have however been somewhat extended. Themes 4 through 6 are new. The specific work items within each theme are shown below.

Theme 1: Develop Highly Efficient Communications in Resource-Constrained Environments

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	Single Aperture/Multi-user RF links	– Allow multiple spacecraft to share a single ground antenna	Deep space uplink and downlink	Short term (Mars missions)		P1E	Mode 1
2	Higher Frequencies and Optical Communications	– Migrate away from congested/contested lower frequency bands – *Provide increased data transmission capacity* – *Reduce tracking time to alleviate network over-subscription*	Missions using "desert ground stations" (deep space); satellite-to-satellite links	Short term for higher frequencies Long term for optical		P1E	Mode 1
3	Efficient Modulation Methods	– Provide Bandwidth-efficient modulation techniques to maximize use of limited spectrum resources – Provide Power-efficient modulation techniques for deep space missions, landed and roving vehicles, etc.	Potentially all missions	Short term for bandwidth-efficient modulations Medium term for power-efficient modulations		P1E	Mode 1
4	High Performance Coding	– Provide improved performance without requiring larger RF aperture/power – *Reduce tracking time to alleviate network over-subscription*	Potentially all missions	Medium term		P1E	Mode 1
5	New Proximity and In-Situ Communications and Navigation Links	– Provide proximity spacecraft-spacecraft and EVA links for constellations and fleets – Provide relay links (surface-orbiter or surface-surface) to stimulate buildup of interoperable data communications infrastructure on and around other Solar System bodies (e.g., Mars) – Provide integrated communications and positioning services	Mars missions and other missions involving relays; space stations	Short term		P1E, P1A, P1J (for the positioning)	Mode 1 and Mode 3

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
6	File Transfer Protocols	– Support autonomous spacecraft – Enable exchange of large quantities of key information during short-duration tracking passes – Enable automation of labor-intensive ground operations – Develop enhanced 'flow control' to allow important data to be transferred more promptly than normal data	Potentially all missions, in particular with data storage capability	Short term		P1F	Mode 1 and 2
7	Security and Privacy	– Protect Data links against unintentional intrusion (e.g. radio interference) – Provide end-to-end data protection against intentional intrusion – *As space missions become more internetworked, risk of malicious activity increases*	In particular, missions with audio and video communica-tions; space-station elements	Short term		P1E, P_{new}, P3, P1A, P1F; P2 particularly for security for data access and distribution	Mode 1, Mode 2 and Mode 3
8	Advanced Data Compression	– Adopt/adapt commercial file compression capabilities (such as ZIP) to extend onboard file storage capabilities – Develop new space-unique lossy compression schemes as necessary to maximize return of large quantities of information	Potentially all mission, in particular missions with on-board storage capability	Medium term		P1A	Mode 1 and Mode 3

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

Theme 2: Develop Standard Data Interchange and Archiving Services

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	Data Management Services	– Define services for short and medium term data repositories – Define experiment data record services – *Enable the development of standard tools for projects to manage the information they gather*	All missions, in particular science and Earth observation missions	Short/ Medium term		P2	All modes
2	Information Infrastructure Architecture for Space Data	– Develop data description techniques – Develop interoperable data dictionaries – Registration procedures – Define interchange structures and protocols – *Enable data to be usable by the widest community of users*	All missions	Short/ Medium term		P2	All modes
3	Space Data Archiving Techniques	– Develop reference model for long-term archival systems – Develop standards for long-term preservation of information – *The information gathered by all missions must be available for future generations; archiving standards will increase the value of that information*	All missions	Short/ Medium term		P2	All modes

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

Theme 3: Develop Standard Space Mission Operations Services

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	Space Link Access						
2	Spacecraft Monitor and Control	– Develop/adopt messaging systems for transmitting commands to space systems and verifying responses – Use commercial/industrial automation approaches – Develop standard language for describing the contents of the mission data base	All mission, in particular cross support missions, e.g., Integral, Mars missions	Short term for messaging systems and automation, medium term for mission data base language		P3 for messaging systems and automation, P2 and P3 for mission data base language	Mode 1
3	Ground System Monitor and Control	– Develop messaging systems for transmitting commands to supporting ground network systems and verifying responses – Use commercial/industrial automation approaches	All missions	Short term (CSOC); otherwise Medium term		P3	Mode 3
4	Tracking and Navigation Services	– Develop orbit determination service – Develop trajectory analysis service – Develop maneuver planning/design service – Develop information interchange techniques for rendezvous and docking techniques	All Mars missions, space stations	Short term		P1J, P3	Mode 1
5	Flight Engineering Services	– Develop spacecraft health/safety monitoring service – Develop performance-analysis service – Develop spacecraft time correlation service – Develop telecommunications link analysis service	Potentially all missions	Medium term		P3	Mode 1
6	Mission Planning Services	– Develop mission profile design service – Develop mission sequence design service	Potentially all missions	Medium term		P3	Mode 1
7	Telecommunications Services	– Develop ground network communications services – Develop audio/video distribution service	Potentially all missions	Medium term		P3 (P2)	Mode 1

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

Theme 4: Develop Interfaces with Commercial Systems

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	Interface with Near-Earth Communications Constellations	– Provide low cost and near–real time telemetry/telecommand access – *Enables potential support to Space Station and LEO Operations* – *Extend institutional communications infrastructure without requiring new investment* – Work with private sector to identify gateways between space mission and public communications systems	Potentially all LEO missions	Medium term		P1E plus P1A then P3	Modes 1 and 2
2	Interface with Commercial Near-Earth Navigation Systems (e.g. GPS, GLONASS, etc.)	– Provide low-cost spacecraft position determination service without requiring unique institutional tracking systems – Point to existing capabilities and recommend an integrated space navigation concept	Potentially all LEO missions	Short term		P1E plus P1J P3	Modes 1 and 2
3	Interface with Commercial Audio and Video Data Distribution	– Support easy bridging of space audio/ video into public media distribution systems – *Enable low cost public "telepresence" in space exploration* – Adopt/adapt standard commercial capabilities such as MPEG, JPEG	Potentially all LEO missions, in particular manned missions	Short term		P_{new} then P3; P2 for Adopt/adapt standard commercial capabilities	Modes 1 and 2

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

Theme 5: Develop Space Missions as "Nodes on Internet"

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	Extension of Internet into Near-Earth Vicinity	– Develop alliances with Internet standardization bodies to allow terrestrial Internet capabilities to be extended into near-Earth space – *Allow experimenters to use familiar Internet-based communications mechanisms and standard application dialogues* – *Reduce costs by using well-tested commercially available systems* – Develop space internet naming and addressing scheme in cooperation with IETF	Potentially all missions, in particular fleets of satellites	Medium term		P1F, P2, P3	Mode 2
2	Extension of Internet into Deep Space	– Develop alliances with Internet standardization bodies to allow terrestrial Internet capabilities to be utilized in deep space and on/around other Solar System bodies – Deploy fragments of the Earth's Internet throughout the Solar System, interconnected by gateways and long-haul communications links, to build up slowly an "Interplanetary Internet" – Develop space internet naming and addressing scheme in cooperation with IETF	Planetary orbiters and rovers	Short term		P1F, P2, P3	Mode 2

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

Theme 6: Develop Interoperable "Plug-'n-Play" Spacecraft Components

Version: 1.0 Date: 26. Oct. 1998

No.	Sub-Task	Elements/*Justifications*	Missions	Schedule	Priority	Imple-menter	Mode of Implemen-tation
1	"Network Ready" Space Devices and Subsystems	– Develop on-board bus/network interfaces – Develop on-board network services – Develop on-board time distribution systems – Develop on-board resource management interfaces – Fill in the mechanical aspects of standardization (e.g., plug and pin power, cooling, mounting interfaces, etc.)	All missions, in particular missions with international participation	Medium-Long term		P_{new}	Modes 2, Mode 3 (Establish joint working groups with ISO/TC 20/SC 14 and industry participants)

Short term: less than 2 years
Medium term: between 2 and 5 years
Long term: more than 5 years

Mode 1: Developer is CCSDS
Mode 2: Alliance with outside CCSDS entity for development
Mode 3: Use of existing standards or elements of them

CCSDS Technical Panel
Terms of Reference
and
Current Plans of Work

(The plans of work will be adapted in accordance with the progress of this Plan.)

CCSDS Panel 1 (P1)
Space Communications

Terms of Reference

Panel 1 is responsible for the efficiency and integrity of communications between source and destination during space operations and for the identification and development of Recommendations to support those communications. Its is organized by subpanels which essentially parallel the layers of the ISO Seven-layer Reference Model:

- Subpanel 1E addresses the Physical Layer: RF and Modulation issues in the Space environment

- Subpanel 1A addresses the Link Layer: data structures, message coding, other considerations

- Subpanel 1F addresses High Layers: networks, transport, file transfers for space data communications

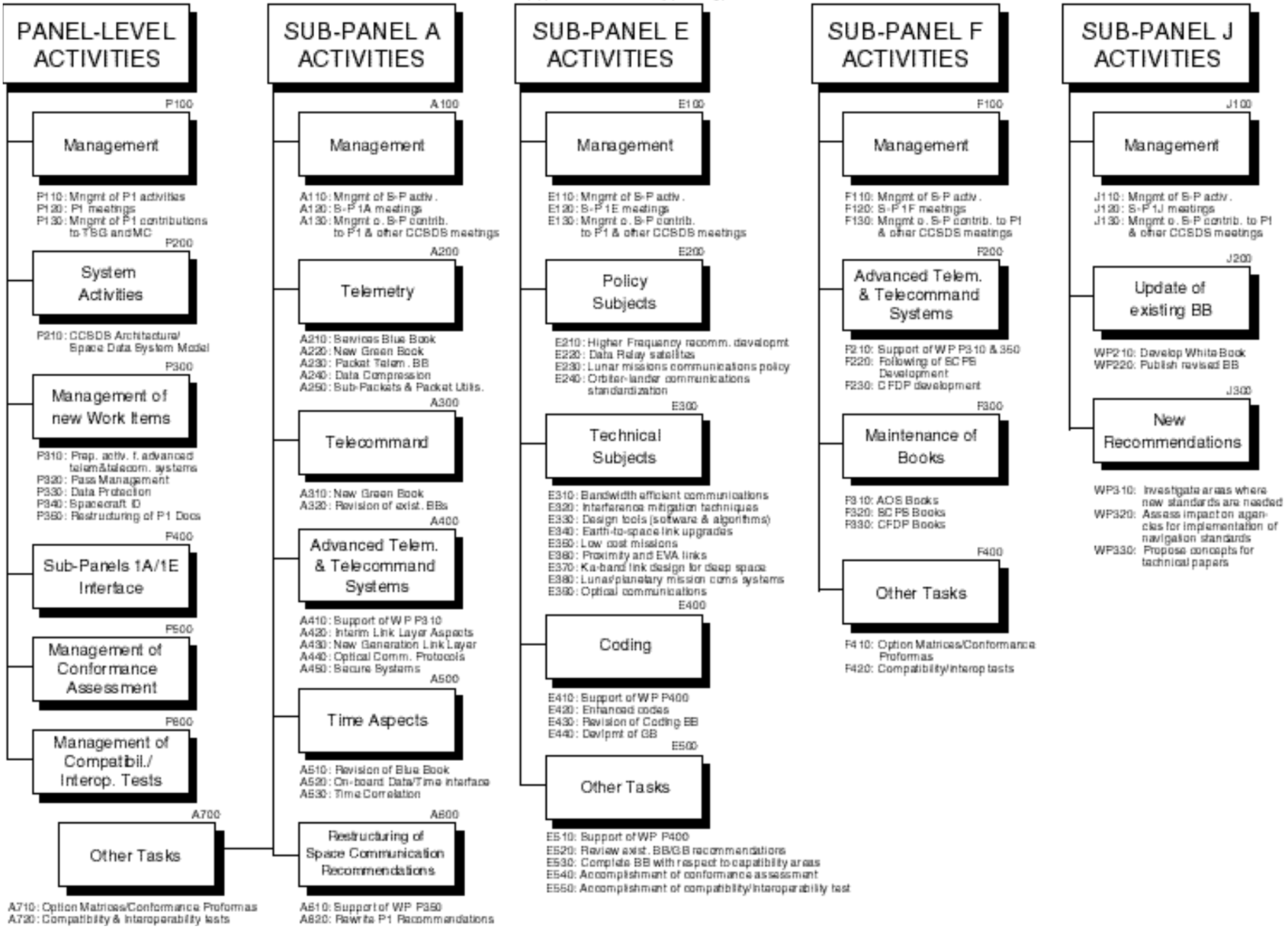
- Subpanel 1J addresses tracking and navigation considerations as required for space operations

Panel 1 is also responsible for the identification of appropriate safeguarding techniques for user authentication and data object protection.

CCSDS PANEL 1 WORK BREAKDOWN STRUCTURE

(approval of P1 Plenary pending)

(Status 1. November 98)



CCSDS Panel 2 (P2)
Information Interchange Processes (IIP)

Terms of Reference

Panel 2 has the major role of integrating recently acquired space data into the global information infrastructure so that they are readily and permanently accessible by interested users. As such, its concern is the functionality of information interchange, as opposed to other CCSDS panels' concerns of real-time transporting and handling of space-related data. Recognizing the problems associated with the interchange of space-related information among autonomous, distributed, and heterogeneous systems having wide variations in time between generation and application of that information, Panel 2's program is organized for identifying and developing standards for:

Data Location	-	Determining whether and where certain data exist
Data Archiving	-	Successfully storing data and their descriptions
Data Access	-	Finding and retrieving old data when requested
Data Understanding	-	Obtaining syntactic and semantic information about the archived data and methods for registering data descriptions
Data transfer	-	Agreeing on common application data formats and other products/data objects for multi-discipline earth and science information interchange activities


CCSDS PANEL 2
100 MANAGEMENT D. Giaretta
110 Work Package Monitoring N. Peccia
120 Maintenance of Management Plan N. Peccia
130 P2 Overview N. Peccia
140 Promotion D. Sawyer
200 REQUIREMENTS D. Giaretta
210 P2 Methodology for Dev. of Recommendations D. Giaretta
220 High Level Req. & Models Doc. D. Giaretta
230 Collected Detailed Req. & Models D. Sawyer
240 Outline Phase Impl. Def. t.b.d.
300 DATA ADMINISTRATION D. Sawyer
310 CA Procedures & Recommendations
320 GB on CA Procedures Tutorial
330 CA Data Structures
340 CA Administrator's Handbook J. Garrett
350 CA User's Handbook J. Garrett
360 CA Ops. Workshops J. Garrett
400 STRUCTURES N. Peccia
410 Structures BB &Tutorial
420 Validation Structures RB/BB
430 Extended Structures Concept L. Reich
440 Referencing Environment N. Peccia
450 Structures BB Corrigendum N. Peccia
460 Structures BB review N Peccia
500 LANGUAGES N. Peccia
510 PVL Recommendations
520 PVL Tutorial
530 Ada as a DDL (EAST) P. Mazal
540 ASN.1 as a DDL N. Peccia
550 TSDN D. Sawyer
560 Standard DED Interchange Structure L. Reich
570 Data Description Requirements C. Nill
580 CCSDS0002 English as a DDL
590 Evolution CIP-B Spec L Reich / C Nill
600 SOFTWARE L. Reich
610 Implementers Workshop L. Reich
620 Joint S/W N. Peccia
700 ARCHIVING D. Sawyer
710 Archiving Ref. Model D. Sawyer
720 Arch. Submission D. Sawyer
730 Arch. Recom.Practices D. Sawyer
511 PVL BB Review J Garrett
ccsds2b.woc

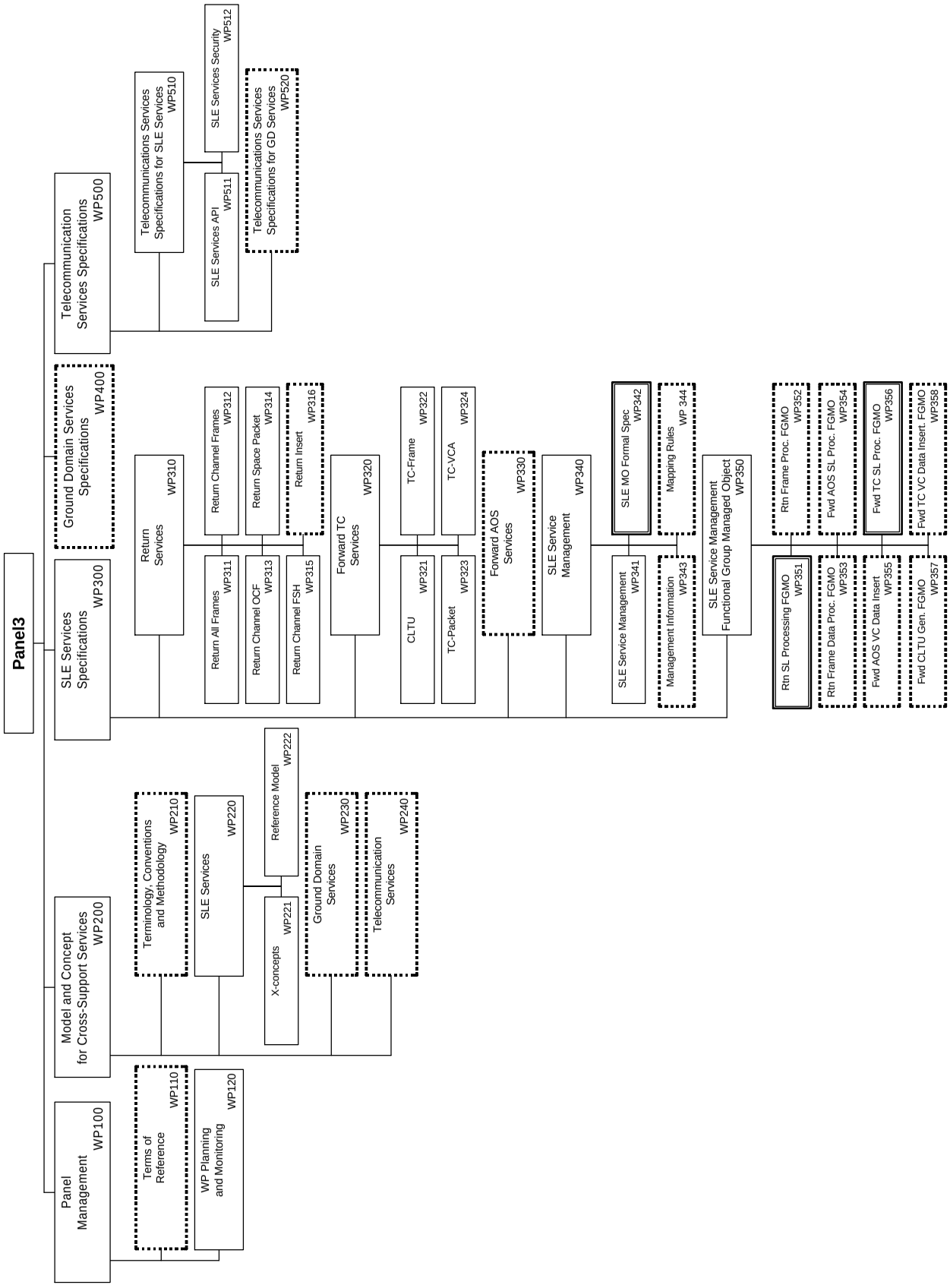
CCSDS Panel 3 (P3)
Cross Support Operations

Terms of Reference

Panel 3 addresses the functionality of extending forward and return communications between the ground-based users and the ground gateway of the space link, hence the term Space Link Extension (SLE).

Additionally, since the ground gateway user interface is that part of the end-to-end data system in which the majority of cross-support operations between the user and the provider Agencies occur, Panel 3 is responsible for the identification and definition of the ground cross support services as well as for the development of Recommendations defining services, related procedures, formats, and protocols for all phases of operational cross support.

Panel 3 is also responsible for the identification of appropriate safeguarding techniques for user authentication and data object protection.


Panel3
Panel Management WP100
Terms of Reference WP110
WP Planning and Monitoring WP120
Model and Concept for Cross-Support Services WP200
Terminology, Conventions and Methodology WP210
SLE Services WP220
X-concepts WP221
Reference Model WP222
Ground Domain Services WP230
Telecommunication Services WP240
SLE Services Specifications WP300
Return Services WP310
Return All Frames WP311
Return Channel Frames WP312
Return Channel OCF WP313
Return Space Packet WP314
Return Channel FSH WP315
Return Insert WP316
Forward TC Services WP320
CLTU WP321
TC-Frame WP322
TC-Packet WP323
TC-VCA WP324
Forward AOS Services WP330
SLE Service Management WP340
SLE Service Management WP341
SLE MO Formal Spec WP342
Management Information WP343
Mapping Rules WP 344
SLE Service Management Functional Group Managed Object WP350
Rtn SL Processing FGMO WP351
Rtn Frame Proc. FGMO WP352
Rtn Frame Data Proc. FGMO WP353
Fwd AOS SL Proc. FGMO WP354
Fwd AOS VC Data Insert WP355
Fwd TC SL Proc. FGMO WP356
Fwd CLTU Gen. FGMO WP357
Fwd TC VC Data Insert. FGMO WP358
Ground Domain Services Specifications WP400
Telecommunication Services Specifications WP500
Telecommunications Services Specifications for SLE Services WP510
SLE Services API WP511
SLE Services Security WP512
Telecommunications Services Specifications for GD Services WP520

CCSDS Publications[3]

CCSDS 100.0-G-1. Telemetry Summary of Concept and Rationale. Green Book. December 1987.
CCSDS 101.0-B-3. Telemetry Channel Coding. Blue Book. May 1992.
CCSDS 102.0-B-4. Packet Telemetry. Blue Book. November 1995.
CCSDS 103.0-B-1. Packet Telemetry Services. Blue Book. May 1996.
CCSDS 120.0-G-1. Lossless Data Compression. Green Book. May 1997.
CCSDS 121.0-B-1. Lossless Data Compression. Blue Book. May 1997. (ISO/DIS 15877.)
CCSDS 200.0-G-6. Telecommand Summary of Concept and Rationale. Green Book. January 1987.
CCSDS 201.0-B-2. Telecommand Part 1 - Channel Service. Blue Book. November 1995.
CCSDS 202.0-B-2. Telecommand Part 2 - Data Routing Service. Blue Book. November 1992.
CCSDS 202.1-B-1. Telecommand Part 2.1 - Command Operation Procedures. Blue Book. October 1991.
CCSDS 203.0-B-1. Telecommand Part 3 - Data Management Service. Blue Book. January 1987. (ISO 12174:1998.)
CCSDS 301.0-B-2. Time Code Formats. Blue Book. April 1990. (ISO 11104:1991.)
CCSDS 320.0-B-1. CCSDS Global Spacecraft Identification Field Code Assignment Control Procedures. Blue Book. October 1993.
CCSDS 401.0-B. Radio Frequency and Modulation Systems-Part 1: Earth Stations and Spacecraft. Blue Book. June 1998.
CCSDS 411.0-G-3. Radio Frequency and Modulation-Part 1: Earth Stations. Green Book. May 1997.
CCSDS 412.0-G-1. Radio Frequency and Modulation Systems—Spacecraft-Earth Station Compatibility Test Procedures. Green Book. May 1992.
CCSDS 501.0-B-1. Radio Metric and Orbit Data. Blue Book. January 1987. (ISO 11103:1991.)
CCSDS 610.0-G-5. Space Data Systems Operations with Standard Formatted Data Units: System and Implementation Aspects. Green Book. February 1987.
CCSDS 620.0-B-2. Standard Formatted Data Units — Structure and Construction Rules. Blue Book. May 1992.
CCSDS 621.0-G-1. Standard Formatted Data Units — A Tutorial. Green Book. May 1992.
CCSDS 622.0-B-1. Standard Formatted Data Units — Referencing Environment. Blue Book. May 1997. (ISO/DIS 15888.)
CCSDS 630.0-B-1. Standard Formatted Data Units — Control Authority Procedures. Blue Book. June 1993. (ISO 13764:1996.)
CCSDS 631.0-G-2. Standard Formatted Data Units — Control Authority Procedures Tutorial. Green Book. November 1994.
CCSDS 632.0-B-1. Standard Formatted Data Units — Control Authority Data Structures. Blue Book. November 1994. (ISO 15395:1998.)

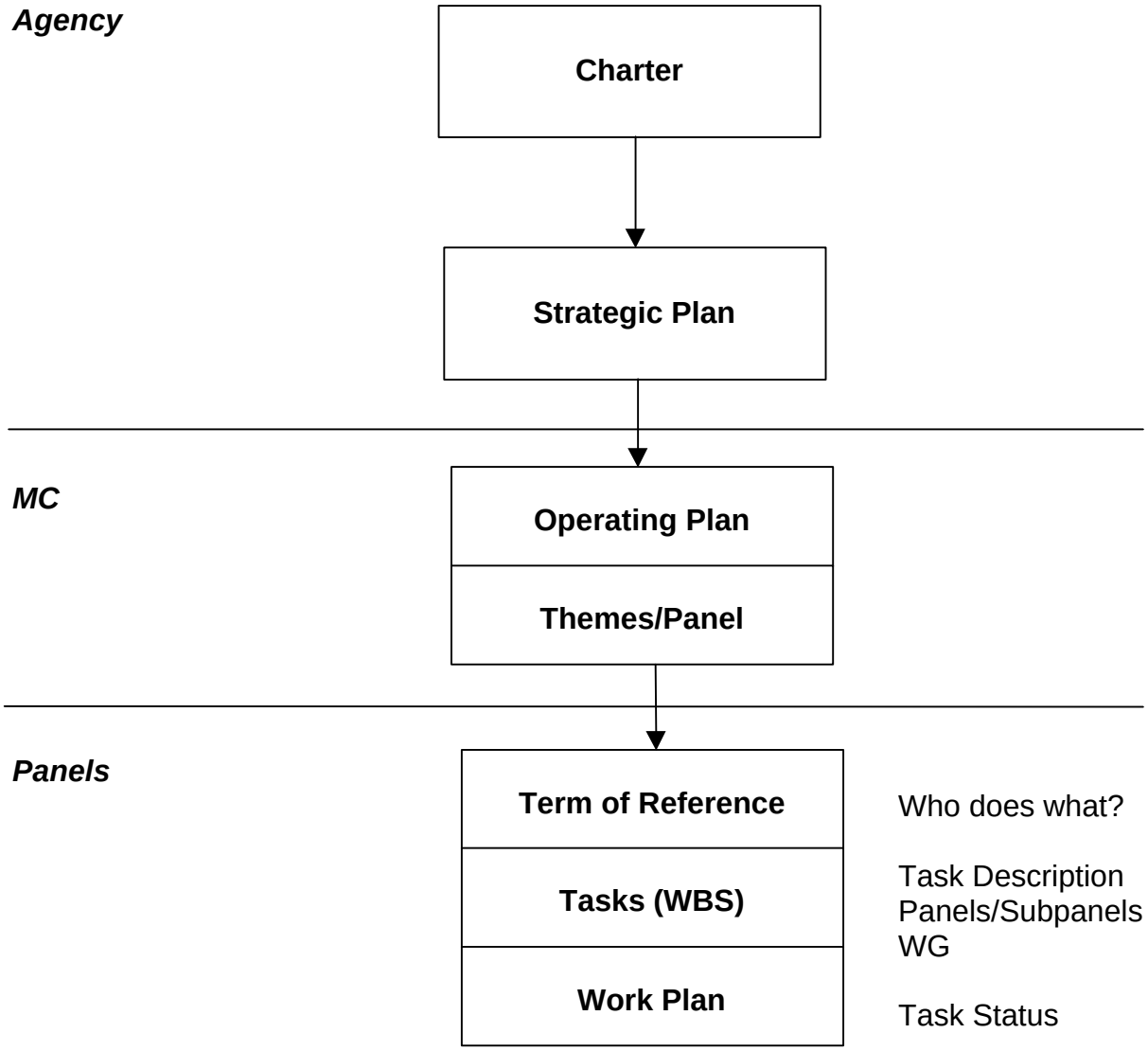
[3] The documents included in this list are current as of the date of this Plan. The most recent versions of CCSDS documents can be found at http://www.ccsds.org/.

CCSDS 641.0-B-1. Parameter Value Language Specification (CCSD0006). Blue Book. May 1992. (ISO 14961:1997.)
CCSDS 641.0-G-1. Parameter Value Language — A Tutorial. Green Book. May 1992.
CCSDS 642.1-G-1. Language Usage in Information Interchange Tutorial. Green Book. October 1989.
CCSDS 643.0-B-1. ASCII Encoded English (CCSD0002). Blue Book. November 1992. (ISO 14962:1997.)
CCSDS 644.0-B-1. The Data Description Language EAST Specification (CCSD0010). Blue Book. May 1997. (ISO/DIS 15889.)
CCSDS 645.0-G-1. The Data Description Language EAST — A Tutorial. Green Book. May 1997.
CCSDS 646.0-G-1. The Data Description Language EAST — List of Conventions. Green Book. May 1997.
CCSDS 700.0-G-3. Advanced Orbiting Systems, Networks and Data Links: Summary of Concept, Rationale and Performance. Green Book. November 1992.
CCSDS 701.0-B-2. Advanced Orbiting Systems, Networks and Data Links: Architectural Specification. Blue Book. November 1992. (ISO 133420:1997.)
CCSDS 704.0-B-1. Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services. Blue Book. May 1994. (ISO/DIS 15890.)
CCSDS 704.1-G-3. Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services. Green Book. May 1994.
CCSDS 705.0-G-2. Advanced Orbiting Systems, Networks and Data Links: Formal Definition of CPN Protocols, Methodology and Approach. Green Book. October 1993.
CCSDS 705.1-B-1. Advanced Orbiting Systems, Networks and Data Links: Abstract Data Type Library—Addendum to CCSDS 701.0-B-2. Blue Book. May 1994.
CCSDS 705.2-B-1. Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the Path Service and Protocol—Addendum to CCSDS 701.0-B-2. Blue Book. May 1994.
CCSDS 705.3-B-1. Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCLC Service and Protocol—Addendum to CCSDS 701.0-B-2. Blue Book. May 1994.
CCSDS 705.4-B-1. Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCA Service and Protocol—Addendum to CCSDS 701.0-B-2. Blue Book. May 1994.
CCSDS 713.0-R-3. Space Communications Protocol Specification (SCPS)—Network Protocol (SCPS-NP). Red Book. September 1997. (ISO/DIS 15891.)
CCSDS 713.5-R-3. Space Communications Protocol Specification (SCPS)—Security Protocol (SCPS-SP). Red Book. September 1997. (ISO/DIS 15892.)
CCSDS 714.0-R-3. Space Communications Protocol Specification (SCPS)—Transport Protocol (SCPS-TP). Red Book. September 1997. (ISO/DIS 15893.)
CCSDS 717.0-R-3. Space Communications Protocol Specification (SCPS)—File Protocol (SCPS-FP). Red Book. September 1997. (ISO/DIS 15894.)
CCSDS 910.0-G-1. Introduction to CCSDS Cross Support. Green Book. June 1990.
CCSDS 910.1-G-1. CCSDS Cross Support System Description Volume 1. Green Book. June 1990.

CCSDS 910.2-G-1. Standard Terminology, Conventions, and Methodology (TCM) for Defining Data Services. Green Book. November 1994.
CCSDS 910.3-G-1. Cross Support Concept — Part 1: Space Link Extension Services. Green Book. May 1995.
CCSDS 910.4-B-1. Cross Support Reference Model — Part 1: Space Link Extension Services. Blue Book. May 1996. (ISO 15396:1998.)
CCSDS 911.1-R-1. Space Link Extension—Return All Frames Service Specification. Red Book. November 1997.
CCSDS 911.2-R-1. Space Link Extension—Return Virtual Channel Frames Service Specification. Red Book. November 1997.
CCSDS 912.3-R-1. Space Link Extension—Forward Space Packet Service Specification. Red Book. November 1997.
CCSDS A12.0-G-1. CCSDS-Related Implementations. Green Book. November 1996.
CCSDS A30.0-G-3. CCSDS Glossary. Green Book. July 1997.

ATTACHMENT Q

HIERARCHY OF CCSDS MANAGEMENT DOCUMENTS


Agency
Charter
Strategic Plan
MC
Operating Plan
Themes/Panel
Panels
Term of Reference
Tasks (WBS)
Work Plan
Who does what?
Task Description
Panels/Subpanels
WG
Task Status

ATTACHMENT R

CCSDS WEB PAGE ENHANCEMENTS

The development Web Page site is located at:

http://wwwdev.ccsds.org/

ATTACHMENT S

PROCEDURES MANUAL CHANGES

CHANGES TO PROCEDURES MANUAL

SECTION 3.1.3.2 DUTIES AND RESPONSIBILITIES (of TSG)

Added f) develop the CCSDS Strategic plan based on the identified overall requirements for CCSDS activities based on future space projects and technology programs; and secure CCSDS Management approval of the Strategic Plan Volume I.

Added g) assist the technical panel chairpersons in adapting their existing work plans to the requirements of the Strategic Plan Volume II.

SECTION 3.1.4.2 DUTIES AND RESPONSIBILITIES (of Technical Panels)

Changed "MC Approval" to "TSG/MC Approval" as appropriate

SECTION 5.1.4 RED BOOK DEVELOPMENT

Within sixty days after the MC has approved a Draft Recommendations for external release and review, the technical editor shall deliver the document electronically, and in hardcopy to the document editor acting as publishing agent for the Secretariat. If circumstances prevent delivery of the document within sixty days, the technical panel responsible for the document shall repetition the MC for approval when the document is ready for delivery.

SECTION 5.1.5 BLUE BOOK DEVELOPMENT

Added: NOTE: Contained in the Foreword of each Blue Book shall be the statement:

CAUTION: System implementers are advised to check the CCSDS Document Listing to ensure that they are using the latest version of each CCSDS Blue Book

SECTION 6.2.1.2 Red Books

When authorized by the MC, the Secretariat, through the services of a Document Manager, shall prepare an electronic version of the RB suitable for on-line distribution and place the electronic version, together with information necessary for the receiving Agencies to properly handle the document (see 5.1.4), on-line in an HTTP-accessible location. When review materials are available on-line, the Secretariat shall announce their availability, via e-mail or facsimile, to the CCSDS Member and Observer Agency Principal Delegates or their designated agents, the CCSDS Panel/Subpanel Chairs, and the CCSDS Liaison Organization Principal Delegates

Agency Document Managers shall be responsible for assuring that their Agencies' reviewers, including Associates sponsored by their Agencies, are made aware of the review and have access to the review document and associated review materials.

ATTACHMENT T

CCSDS-COMPATIBLE PRODUCTS OUTLINE

CCSDS-COMPATIBLE PRODUCTS

This document presents those vendors who purport to market CCSDS-compatible products. The list is offered as assistance to spacecraft and ground system designers wishing to use CCSDS/ISO data standards in finding proven and economical commercial off the shelf (COTS) products.

The document is organized along major data system divisions. Each section addresses a given division, i.e., Telemetry, and identifies CCSDS-compatible equipment. Performance specification data for each product is given in the Annex.

It is expected that this document will be revised frequently as more CCSDS/ISO standards are developed and more manufactures build CCSDS-compatible products.

ATTACHMENT U

ESA PROPOSAL FOR REVIEW OF CCSDS WORKING METHODOLOGY

ESA Position Paper for CCSDS Management Council May 1999 Proposal for review of CCSDS Working Methodology

1 INTRODUCTION

ESA is increasingly encountering difficulties in getting top management's approval of missions related to CCSDS activities; in particular if a larger number of ESA staff needs to travel at the same occasion.

A number of measures have already been taken, such as in principle not sending more than one delegate per panel or sub-panel, travelling on cheap flights, increasing the amount of work done through e-mail and tele-or video-conferences, but this does not seem to suffice. At this spring 1999 meeting we had to apply even more drastic criteria. As we still believe in the importance of the CCSDS activity, this paper intends to propose a revision of our working methodology, with the aim of still reaching at least the most important objectives.

2 WORKING METHODOLOGY PRINCIPLES

2.1 Each member Agency indicates, among the tasks agreed in the Strategic Plan, which are its own priorities, including work items from the existing work plans.

2.2 Consequently, each Agency indicates in which Panel, sub-Panel or Working Group it wants to participate.

2.3 For each task (a work package of the plan), a "task force" of experts is nominated and a rapporteur for the paper(s) to be drafted is chosen.

2.4 The rapporteur, after having consulted the nominated experts by e-mail, phone or video-conference, prepares an initial draft of the paper.

2.5 He then circulates this draft and collects the comments of all the experts through the same media.

2.6 He then prepares a new draft.

2.7 The cycle 2.4, 2.5 & 2.6 is repeated until a point is reached where any further progress requires a meeting of the task force.

2.8 In this case a meeting should take place, choosing the most convenient location and applying some alternation and good sense principles.

2.9 The plenary meetings with all panels and sub-panels should be reduced to one per year.

2.10 The choice of the site should be done according to alternation criteria.

2.11 The plenary meeting comprises:

- A meeting of the three main panels (1, 2 and 3) including all rapporteurs, but no sub-panels' meetings
- A meeting of the TSG
- The MC meeting.

2.12 The P1, P2 and P3 meetings discuss all the papers produced by the task forces belonging to its sphere of competence.

2.13 The P1, P2 and P3 meet at the TGS, consolidate the technical work plan and inform the MC of the status of each paper (white, red or blue and green book) and submit blue papers for final approval to the MC.

3 RECOMMENDATION

The CCSDS MC is invited to discuss this proposal for a revision of the CCSDS working methodology with the main objective to have the frequency and size of technical meetings adjusted to the minimum required to achieve the anticipated progress.

It is proposed to update the corresponding chapters of the CCSDS procedures handbook.

ESA wishes again to emphasise its obligation to support the work of CCSDS which is considered being a very important task and asks for understanding by the other members. It is hoped that by adequate rearrangements of meetings work progress can be maintained.